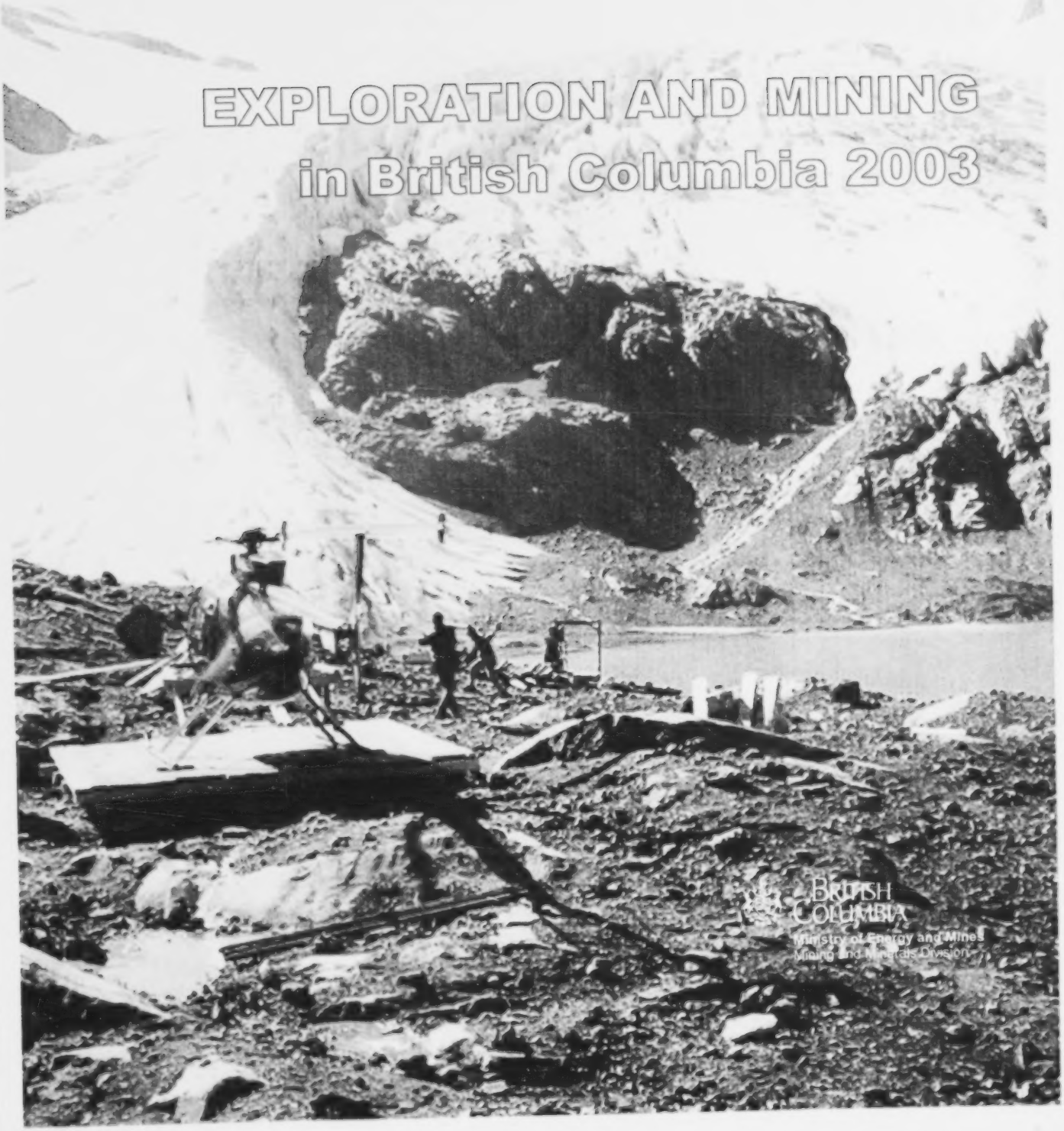
EXPLORATION AND MINING in British Columbia 2003



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Helicopter-supported drilling of copper-gold porphyry mineralization on the Big Bulk prospect in the Kitsault area by Canadian Empire Exploration Corp.

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PRINCE GEORGE
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MARCH 2004

FOREWORD

This volume provides details of mining and exploration activity in British Columbia during 2003. Regional geologists in Mining Division offices in Cranbrook, Kamloops, Prince George and Smithers prepared reviews of activity. The year 2003 witnessed the beginning of a significant upturn in the mining industry in British Columbia. Several factors contributed to the turnaround: (1) rising prices for coal, base and precious metals, (2) a strongly renewed flow of risk capital to the mining sector that rejuvenated junior companies, and (3) new government policy on issues that affect the industry. Exploration expenditure is the traditional measure of industry health; this figure climbed to an estimated $55 million, an increase of $15 million over 2002.

British Columbia produces a variety of solid mineral commodities. The value of production is forecast at $2.96 billion, the most important commodities are coal (35%), copper (20%), construction aggregates (19%), gold (12%), silver (5%), molybdenum (4.5%), zinc (2.6%) and lesser amounts of other metals and industrial minerals. Five metallurgical coalmines in the Southeast coalfield, Fording River, Greenhills, Line Creek, Elkview and Coal Mountain, were consolidated under one owner. Bullmoose, in the Peace River coalfield, closed after 20 years of operation. Thermal coal is produced from Quinsam on Vancouver Island and from Basin Coal, a new mine near Princeton. The six metal mines in the province improved in profitability in 2003. Valley Copper, a huge porphyry deposit near Kamloops, is the largest copper producer in Canada. The large Kemess open pit mine and the contrasting Eskay Creek underground mine, small but of exceptional grade, are among the largest gold producers in the country. Eskay Creek has the added distinction of being the fifth largest silver producer in the world. Endako mine is Canada's largest supplier of molybdenum. Myra Falls, on Vancouver Island, produces copper, zinc, silver and gold. Copper is produced at the Huckleberry mine in northwest British Columbia. In addition, there are some 32 industrial mineral quarries and mines.

Strengthening prices for commodities in addition to gold, which began to rise a year earlier, prompted a diversification in exploration activity. Copper and coal are of particular note because these are commodities in which the Province is well endowed. Junior and mid-size companies led the upsurge in activity. Gibraltar and Mount Polley open pit copper mines are poised to re-open. Mount Polley is augmented by the most significant discovery in 2003, the Wishbone porphyry copper-gold zone. Feasibility studies (or updates) or economic scoping studies began on many other copper and/or gold projects: Kemess North, Red Chris, Morrison-Hearne Hill, Afton, Willa, Galore Creek, Sustut, Tulsequah Chief, J&L, Kutcho Creek and New Polaris. The first three of these projects entered government's Environmental Assessment process to attain Mine Development Certificates. Among coal projects, Willow Creek may begin production in 2004 and Perry Creek submitted a revised development plan to the Environmental Assessment Office.

In 2003 there were 85 exploration projects in the province with expenditures in excess of $100 000, an increase from 75 in 2002. Total drilling is estimated to be 323 000 metres, up substantially from 215 000 metres in the previous year. The most significant exploration programs were:

- In the Northwest region; large drilling programs at Red Chris, Galore Creek, both copper-gold projects, and the Tulsequah Chief copper-zinc-silver-gold project, and encouraging results from the early stage work at the Thorn silver-gold, Nak copper and Foremore polymetallic projects
- In the Northeast-Central region; large drilling programs at the closed Mount Polley copper-gold and Gibraltar copper mines, the underground bulk sample extracted from the Bonanza Ledge gold deposit, the advance of several coal deposits toward production and promising results from Pine and 3Ts, both gold-silver projects
- In the Kootenay region; the Lexington copper, Kena gold and Willa copper-silver projects
- In the South-Central region; the continued delineation of copper resources below the closed Afton open pit, drilling at the Elk gold-silver project and advanced exploration at Bralorne, a major past-producer of gold
- In the Southwest region; the resumption of exploration drilling at Myra Falls and the extraction of a bulk sample of alumina-silica rock from the Apple Bay project.

Unlike previous issues of this publication, this volume contains only an abbreviated report for Southwest region where there is no regional geologist. Also, there are no papers describing specific projects, that comprised previous editions of this volume (as Part B) and normally written by a combination of government and industry geoscientists. We would like to acknowledge the work of David Terry, who resigned his position as regional geologist in Cranbrook early in 2004. We wish him well in his return to industry; his contribution will be missed. We sincerely thank W.J. (Bill) McMillan, who critically reviewed all papers, and Bob Lane, regional geologist, who performed the desktop publishing of the volume.

Paul Wojdak
Regional Geologist, Smithers

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NORTHWEST REGION

By Paul Wojdak, PGeo

Regional Geologist, Smithers

SUMMARY AND OUTLOOK

Mineral exploration activity increased again in 2003 and higher metal prices benefited mines in the region. Exploration spending in the Northwest doubled from 2002 to $21.1 million (see Figure 1). Exploration drilling, a major indicator of work on advanced properties, increased substantially from 57 252 metres in 2002 to 98 872 metres in 2003 (see Figure 2). The growth in the number of mineral claims in the region vividly demonstrates the improved health of the mining industry. Activity jumped in all four mining divisions: Atlin, Omineca, Skeena and Liard. There were 14 931 units staked and only 2743 lapsed or forfeited, the fifth successive year where the number of lapsed claims decreased (Figure 3). The net increase of 12 188 claim units in 2003 reflects high activity at the grassroots level of the industry.

Despite an increased mining rate, production of gold and silver from the Eskay Creek mine diminished slightly because lower grade ore was mined. Current reserves of high grade, direct-shipping ore at Eskay Creek will be exhausted in 2005, although known reserves of milling ore will last until 2008. However, the mine has a track record of adding reserves and Barrick Gold Corporation reported that recent exploration of the 22 zone at Eskay Creek is "encouraging". The output of molybdenum from Endako is similar to that in 2002 but production of copper and molybdenum from the Huckleberry mine declined slightly due to decreased mill throughput. Huckleberry is expected to maintain operations until 2007; under favourable economic conditions, Endako could continue until 2010. Mine data, including production and reserves, is shown in Table 1. All mines benefited from the strong resurgence in metal prices that more than offset decreased metal output. The locations of mines and exploration projects are shown in Figure 4.

Renewed exploration and pre-development work on advanced prospects highlight exploration in 2003. NovaGold Inc. acquired the Galore Creek property and bcMetals Corporation Ltd. optioned the Red Chris prospect. Both contain large copper-gold porphyry deposits that are near the development stage. Late in the season, immediately upon completion of acquisition agreements, the new owners of both Galore Creek and Red Chris began work necessary to reach development

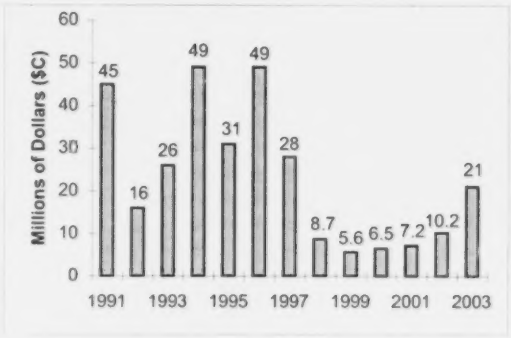


Figure 1. Exploration Expenditures in Northwest British Columbia.

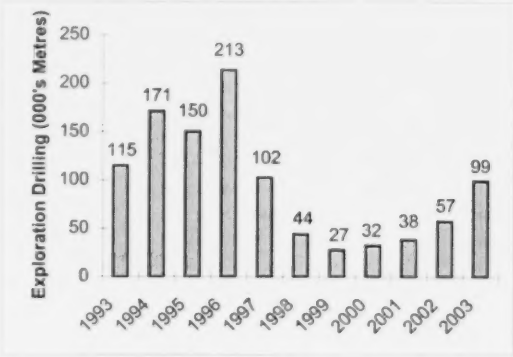


Figure 2. Exploration Drilling in Northwest British Columbia.

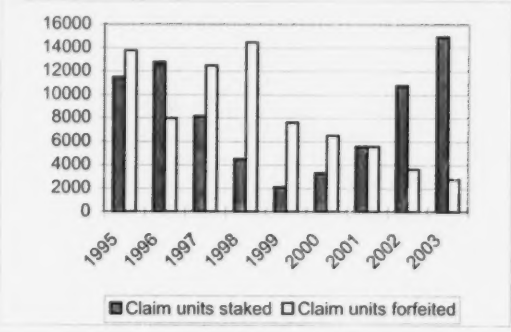


Figure 3. Claim Activity Summary in Northwest British Columbia

decisions. In both cases, mine development would require significant new infrastructure. bcMetals announced updated Measured plus Indicated resources at Red Chris totaling 60.1 million tonnes grading 0.70% Cu and 0.59 g/t Au at a 0.5% Cu cut-off. Updated figures are not yet available for Galore Creek. Armed with a reconfirmed Mine Development Certificate, Redcorp Ventures Ltd. undertook a sizeable drilling campaign at the Tulsequah Chief volcanogenic massive sulphide deposit. The program augmented copper-zinc-silver-gold resources, and discovered a new ore lens. Both Red Chris and Morrison, a copper-gold porphyry deposit owned by Pacific Booker Minerals Inc., entered Government's Environmental Assessment process to attain Mine Development Certificates. A production rate of 25 000 tonnes per day is proposed for Red Chris and a 20 000 to 25 000 tonne per day rate for Morrison.

Table 2 lists significant exploration projects in the region. Spending on each of the largest programs, where expenditure exceeded $1 million, were Red Chris, Galore Creek, Eskay Creek, SIB/Eskay district, Tulsequah Chief, Turnagain and Foremore. Promising discoveries or significant exploration results were announced from several projects. In the far northwest, drilling by Cangold Limited and Rimfire Minerals Corporation on the Thorn property encountered a wide zone of epithermal silver-gold mineralization and Imperial Metals Corporation intersected significant copper in its holes on the Nak quasi-volcanogenic prospect. In the Iskut district, prospecting by Roca Mines Inc. discovered volcanogenic massive sulphide mineralization on the Foremore property but only one drill hole was able to extend the zone. On the Kalum property near Terrace, prospecting and geological work by Eagle Plains Resources Ltd. located new gold veins and outlined targets in known zones to be tested by drilling in 2004. Canadian Metals Exploration Ltd. continued to intersect wide zones of low-grade nickel in the Turnagain ultramafic complex but the economic potential has not been determined. On the Big Bulk porphyry prospect, Canadian Empire Exploration Corp. intersected interesting widths of copper-gold mineralization. Looking ahead to 2004, the largest drilling program in the region will be at Galore Creek. Drilling is also anticipated at a number of other copper-gold porphyry prospects including GJ (Kinaskan), Kerr and Copper Creek (Kaketsa).

METAL MINES

At the **Eskay Creek** underground gold-silver mine, Barrick Gold Corporation increased the mining rate to 690 tonnes per day (tpd). Gold output in 2003 was 10 951 kilograms (352 069 ounces) and silver was 527 775 kilograms (Table 1). These volcanogenic massive sulphide deposits, which have exceptional gold and silver content and an epithermal geochemical signature, occur at the top of the early Jurassic Hazelton Group. The Eskay Creek deposits formed during the last stages of volcanic activity in the Hazelton volcanic island arc and during the early stages of formation of the mid - Jurassic Bowser rift

TABLE 1. MINE PRODUCTION AND RESERVES

Mine	Operator	Employment	Production (2003)	Reserves (on Jan. 1, 2003 unless stated	Reference for Reserves
Endako	Thompson Creek Mining, Ltd. & Nissho Iwai Moly Resources Inc.	229	5 000 000 kg Mo (approx.)	Endako Pit, 38 200 000 tonnes at 0.072% Mo; Denak Pit, 22 700 000 tonnes at 0.069% Mo; Stockpile, 26 300 000 tonnes at 0.048% Mo (on Oct 1, 2003)	Alan Morrish, Vice President and General Manager, written comm., Dec. 5, 2003
Eskay Creek	Barrick Gold Corporation	316	10 951 kg (352 069 oz) Au, 527 775 kg Ag	Shipping ore, 248 264 tonnes at 56.4 g/t Au, 3015 g/t Ag; Milling ore, 592 631 tonnes at 25.77 g/t Au, 1013 g/t Ag	E.J. Mahoney, Chief Geologist, written comm., Feb. 16, 2004
Huckleberry	Imperial Metals Corporation	225	32 780 828 kg Cu, 323 499 kg Mo, 8017 kg Ag, 289 kg Au	25 018 000 tonnes at 0.507% Cu, 0.014% Mo, 0.059 g/t Au, 2.97 g/t Ag	J.C. Bottaro, Chief Mine Engineer, written comm., Feb. 24, 2004
Fireside	Fireside Minerals Ltd.	20 (seasonal)	10 000 tonnes barite	Not available	

Table Notes: Employment includes all employees and contractors as of December, 2003.

basin. Rift tectonics controlled formation and accumulation of the various Eskay Creek massive sulphide bodies along the folded western margin of the Bowser Lake Group, a series of clastic sedimentary rocks that filled the Bowser Basin. Approximately half of daily mine production in 2003, some 360 tpd, came from the stratiform 21B orebody; it is direct-shipping smelter ore. Direct-shipping ore amounted to 134 850 tonnes and graded 67.5 g/t Au and 3141 g/t Ag. It was trucked either to Stewart for ship loading to Japan, or to Kitwanga for rail shipment to Quebec. Direct-shipping ore is custom-blended to suit contract terms at each smelter; the cut-off grade is 30 g/t gold equivalent. A further 25% of production came from the NEX zone, the northern extension of 21B, and the balance came from the Pumphouse, Hanging Wall and footwall zones. Most ore from these areas is treated in a flotation mill at a rate of 330 tpd. Mill ore amounted to 115 052 tonnes at an average grade of 24.3 g/t Au and 1213 g/t Ag. Gold production cost for 2003, net of silver credits, is estimated at $US 67 per ounce.

The 21B deposit consists of clastic beds in the Contact Mudstone containing sphalerite, tetrahedrite – freibergite, lead-sulphosalts (including boulangerite, bournonite, jamesonite), stibnite, galena, pyrite, electrum and amalgam. Because this high-grade, mudstone-hosted ore contains problematic amounts of mercury, antimony and arsenic, it must be shipped to smelters for treatment. Northward, sulphosalt minerals in the ore zone are less abundant and concentrations of toxic elements are lower. Consequently, most NEX ore is amenable to on-site processing. To the south, the stratiform 21A zone consists of massive to semi-massive realgar, stibnite, cinnabar and arsenopyrite with moderate gold content; it has been uneconomic to mine due to very high levels of deleterious elements. Basalt overlying the 21B zone is not mineralized but intercalated mudstone beds stratigraphically above the 21 zones that are generally above the first basalt flow or sill, contain massive pyrite-sphalerite-galena-chalcopyrite and barite-rich gold-bearing layers. These are referred to as hangingwall ore and mined mainly as mill feed. Footwall ore in the underlying rhyolite consists of the silicified, pipe-shaped 109 zone, and sericitic rhyolite with disseminated pyrite in the 21C zone. The 109 zone contains stockwork veins carrying coarse sphalerite, galena, pyrite, visible gold and amorphous carbon. Footwall ore has lower gold grades, negligible silver and low levels of toxic elements compared to stratiform ore, so it too is treated on site. Ore from the 109 zone has good mining and ideal milling characteristics but other footwall zones are in weak ground and/or are difficult to mill; consequently, the cut-off grade for mill ore varies from 12 to 15 g/t gold equivalent. Mining costs at Eskay Creek are uncommonly high, approximately $600 per tonne, due to difficult mining conditions, environmental considerations and transportation costs. Mudstone and altered rhyolite are very weak and because the 21 zone orebodies are near the hinge of a tight anticline, they are under high strain. Ground conditions dictate the size of development workings and drift-and-fill stopes, which are generally less than 2.5 metres wide by 2.5 metres high. Stopes are backfilled with cemented gravel, hauled by truck from the Iskut River. Potentially acid generating waste rock is trucked 8 km to Albino Lake for sub-aqueous disposal. Mill tailings are pumped through a 5 km pipeline to Tom MacKay Lake for subaqueous disposal.

Eskay Creek continued to develop new ore zones during 2003. A spiral ramp system was advanced to access ore at the deepest levels in the NEX trend, which plunges north at about 55°. Production began late in the year from a new stope in the 44 zone, some 300 metres below surface. Fill-in drilling of the Water Tower zone, a footwall zone similar to 21C, found erratic gold grades and assessment of the zone continues. Exploration at Eskay Creek made use of 35 500 metres of surface and underground diamond drilling. The main focus of the 71-hole surface program was the 22 zone, situated 2 km south of the mine site. Drilling also expanded known resources in the 21C, 21A and 21E zones. At the northern end of the deposit, deeper holes tested the area down plunge from the NEX and Hangingwall zones. In its third quarter report, Barrick describes exploration results as "encouraging" and noted that drilling targeted both stratiform and structurally controlled mineralization. On January 1, 2004 the total of mill and smelter ore reserves was 840 895 tonnes at an average grade of 34.81 g/t Au and 1604 g/t Ag.

Endako is a porphyry molybdenum deposit within an early Cretaceous granite batholith. The Endako open pit mine has operated for 33 years and is a low-cost producer. Thompson Creek Mining Ltd. (75%) and Nissho Iwai Moly Resources Inc. (25%) own the operation. The pit, which is elongated west-northwest, measures 650 metres by 230 metres and is 250 metres deep. The mill normally processes 28 000 tonnes per day, the total for the year was 9.8 million tonnes of ore containing 0.070% Mo. Molybdenum production was approximately 5 000 000 kilograms, the exact amount is confidential. Most of the flotation concentrate is converted to molybdic oxide in an on-site roaster. The balance is upgraded and sold as 'Ultrapure' (a trademarked product containing 99.15% molybdenum sulphide). Endako treats concentrate from other mines on a toll basis sporadically, depending on roaster capacity and the availability of material. During the year, the price of molybdenum rose to more than US $7 from less than US $4 per pound at the beginning of the year.

Slope instability on the South wall of the Endako pit resulted in changes to the mine plan in 2003. Mining was

TABLE 2. MAJOR EXPLORATION PROJECTS, 2003

Property	Operator	MINFILE	NTS	Commodity	Deposit Type	Work Done
Beale	Sutcliffe Resources Ltd.	104I 098	104I/14	Au	Intrusion-related Gold	Geol; Prosp; Geochem
Big Bulk	Canadian Empire Exploration Corp.	103P 016	104P/11W	Cu, Au	Porphyry	Geol; 11 ddh, 1664 m
BX	Goldrea Resource Corp. & Golden Chalice Resources Inc.	new	104B/10W	Au, Ag, Cu	Vein	Geol; 3 ddh, 509 m
Clone	Lateegra Resources Corp.	103P 251	103P/13W	Au	Shear Vein	8 ddh, 330 m
Copper Creek (Kaketsa)	Firesteel Resources Inc.	104J 005, 018, 035	104J/4E	Cu, Au	Porphyry	Geol; Geochem; IP, 10 km
Del Norte	Lateegra Resources Corp.	104A 161	104A/4E	Au, Ag, Zn	Vein	10 ddh, 850 m
Eskay Creek	Barrick Gold Corporation	104B 008	104B/9W	Au, Ag, Zn, Cu	Epithermal VMS	Geol; 71 sfc ddh, 18 328 m; U/g ddh, 17 172 m
Foremore	Roca Mines Inc.	104G 148	104G/2W	Cu, Zn, Ag, Au	VMS	Geol; Prosp; Geochem; Max-Min EM, 13.8 km; 11 ddh, 1031 m
Galore Creek	NovaGold Inc.	104G 090, 092, 095, 099	104G/3W	Cu, Au, Ag	Alkalic Porphyry	Geol; 8 ddh, 2947 m; Reclamation
Georgia River	Mountain Boy Minerals Ltd.	103O 013	103O/16E	Au	Orogenic Gold Vein	20 ddh, 1010 m
GJ (Kinaskan)	International Curator Resources Inc.	104G 034, 086, 171, 177	104G/9E	Cu, Au	Porphyry	Geol; Airborne EM-Mag, 1300 km; IP & Mag, 18 km; 254 O/B holes
Homestake Ridge	Bravo Venture Group Inc.	103P 216, 082, 093	103P/12E	Au, Ag	Intrusion-related Gold; VMS	Geol; 11 ddh, 1001 m
Kalum	Eagle Plains Resources Ltd.	103I 018, 019, 020, 021, 173, 174, 211, 213	103I/10, 15	Au, Ag	Epithermal Vein; Intrusion-related Gold	Geol; Prosp; Geochem
Morrison	Pacific Booker Minerals Inc.	093M 007	93M/1W	Cu, Au	Porphyry	8 ddh, 2420 m; Engineering & Environmental studies
Nak	Imperial Metals Corp.	104N 136	104N/2W	Cu	VMS ?	Geol; Prosp; Geochem; HLEM, 4.5 km; 9 ddh, 1511 m
New Polaris	Canarc Resource Corp.	104K 003	104K/12	Au	Mesothermal Vein	3 ddh, 1554 m
PBR	Roca Mines Inc.		104B/15E	Au, Ag	Epithermal VMS	Extend 1 ddh, 351 m
Praxis	Praxis Goldfields Inc.		103P/12W, 103P/13W	Cu, Zn, Au, Ag	VMS	3 ddh, 1239 m
Red Chris	bcMetals Corp.	104H 005	104H/12W	Cu, Au	Porphyry	Test pits; 49 ddh, 16 591 m
SIB/ Eskay district	Heritage Explorations Limited	104B 376, 383, 078	104B/9, 10	Au, Ag	Epithermal VMS	Geol; Geochem; 14 ddh, 3841 m
Table Mountain	Cusac Gold Mines Ltd.	104P 070	104P/4W	Au	Orogenic gold vein	Drill access, 300 m; 2 ddh, 626 m
Taurus	Navasota Resources Ltd.	104P 010, 011, 012	104P/5E	Au	Orogenic gold vein	Geol; 13 ddh, 1974 m
Thorn	Cangold Limited & Rimfire Minerals Corp.	104K 031	104K/10W	Au, Ag, Cu	Epithermal Vein	Excavator trenching, 800 m; 8 ddh, 874 m
Tommy Jack	Kodiak Resources Inc.	94D 031	94D/4E	Au, Ag	Intrusion-related Gold	Geol; IP, 20 km; 5 ddh, 1036 m
Tulsequah Chief	Redcorp Ventures Ltd.	104K 002	104K/12E	Cu, Zn, Ag, Au	VMS	2 sfc ddh, 1069 m; 21u/g ddh, 9040 m
Turnagain	Canadian Metals Exploration Ltd.	104I 119	104I/7W	Ni, Cu, Co, Pt, Pd	Magmatic	23 ddh, 8624 m
William's Gold	Stikine Gold Corp.	94E 092	94E/13	Au	Intrusion-related Gold	11 ddh, 2855 m

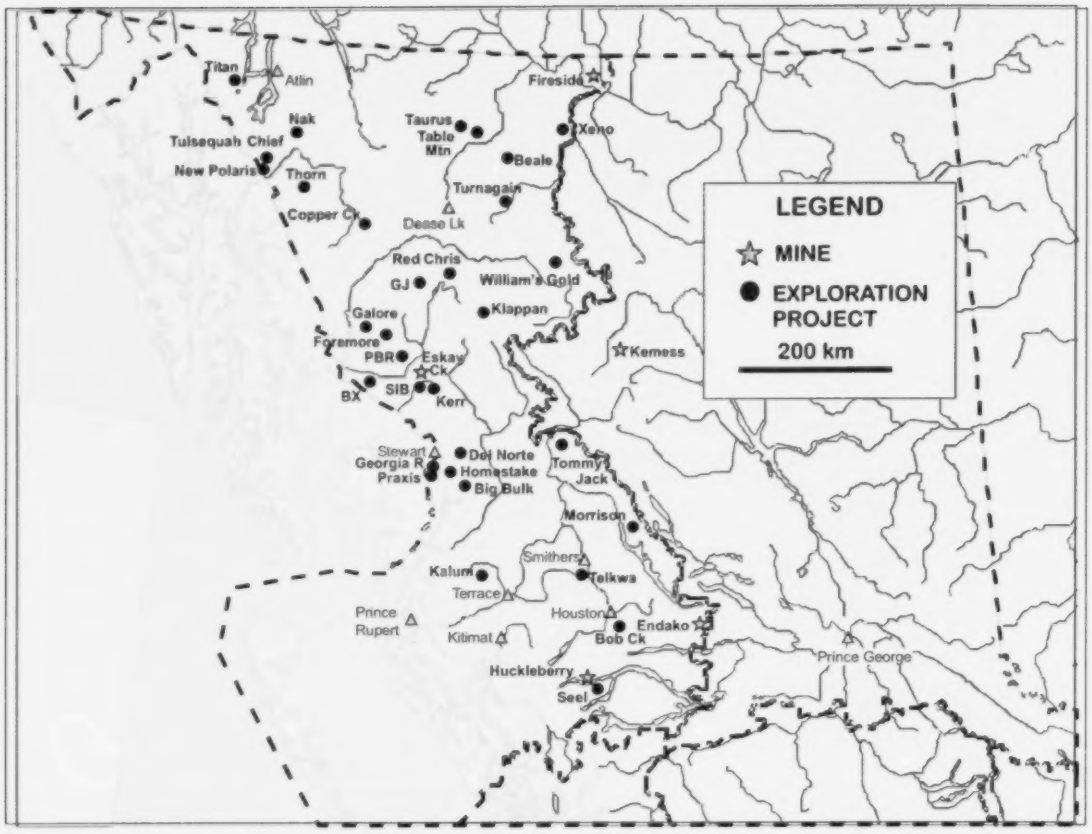


Figure 4. Location map, Mines and Exploration Projects in Northwest British Columbia, 2003.

relocated away from the toe of the slide to an area of slightly lower grade material. Metal production was only slightly affected because mill recovery was higher in the lower grade ore. Stripping of waste rock on the South wall of the Endako pit to unload the South Basalt fault and alleviate slope instability proceeded throughout the year. Stripping was interrupted at times by recurring ground movement and unavailability of haul trucks during repair of the conveyor from the in-pit crusher. Despite this, more than 5 million tonnes of waste rock were mined. A small slide also occurred on the North wall but had minimal affect on production.

Huckleberry is a porphyry copper deposit related to the late Cretaceous Bulkley intrusions. Huckleberry Mines Ltd. is owned by Imperial Metals Corporation (50%) and a consortium of Mitsubishi Material Corp., Dowa Mining Ltd., Furakawa Company Ltd. and Marubeni Corp. The mine is located at the foot of Huckleberry Mountain, 125 kilometres by road from Houston (Photo 1). Copper mineralization, which occurs in two zones one kilometre apart, is developed within a granodiorite stock, in a related dike, and in adjacent hornfelsed and fractured volcanic rocks. Production from the Main zone ended in 2002, so all ore mined in 2003 came from the East pit. The mill processed 6 699 100 tonnes grading 0.542% copper, at an average rate of about 21 000 tpd. Copper production was 32 781 tonnes (see Table 1), an average recovery of 86.5% but molybdenum recovery was just 17.6%. East zone ore is not as amenable to molybdenum recovery as the Main zone ore was. Copper concentrate is trucked to the port of Stewart for shipment to Japan. Economic gains afforded by higher copper price were partially offset by increased costs due to a stronger Canadian versus US dollar exchange rate.

Mining of the East zone required removal of overburden (glacial till) and waste rock, mainly east of the starter pit. This material includes potentially acid generating waste rock that is dumped into the Main pit,

which will be flooded when the mine closes. In October and November, two separate slides of overburden occurred on the north wall of the East pit. Ore production was interrupted and up to one million tonnes of material must be removed to stabilize the pit wall. Better diversion of runoff water from Huckleberry Mountain away from the pit will reduce the risk of a recurrence.

Photo 1. View west over the Huckleberry open pit mine showing Phase 2 stripping on the high wall of the East pit. The concluded Main pit and tailings pond are in the middle distance and Tahtsa Reach is in the far distance.

MINERAL EXPLORATION

Tulsequah-Taku Area

Redfern Resources Ltd., a wholly owned subsidiary of Redcorp Ventures Ltd., conducted a surface and underground drill program to locate extensions of existing resources at the **Tulsequah Chief** deposit (104K 002). Tulsequah Chief is a volcanogenic massive sulphide deposit located in the hinge zone and limbs of a steeply plunging syncline within Mississippian strata. Sulphide lenses are stacked near the base of a rhyolite-dominated sequence overlying a quartz-pyrite-sericite-cordierite alteration zone in a thick sequence of mafic volcanic rocks. In the 1950's Cominco Ltd. mined 575 000 tonnes from Tulsequah Chief. Exploration up to 1994 by Cominco and Redfern determined a measured and indicated resource of 5 940 000 tonnes grading 1.42% Cu, 1.26% Pb, 6.72% Zn, 107 g/t Ag, 2.59 g/t Au and an additional 3 million tonnes of inferred resources of similar grade. The deposit is open in several areas. Continuity is excellent in the down-dip direction but drill holes at least 800 metres long are required, therefore Redfern explored a more accessible area west of the deposit for a continuation of ore lenses across the 4400 fault. A new massive sulphide lens, with deposit-average grade that is stratigraphically above the main deposit, was intersected in six holes. Nine holes cut the principal H lens, including an uncommonly thick (37 metre) intercept, and six holes cut the AB lenses. One intersection of uncertain correlation returned exceptional precious metal grades of 16.3 g/t Au, 511 g/t Ag, 0.08% Cu, 0.7% Pb and 1.2% Zn over 7.6 metres. The company contracted an independent audit to bring measured and indicated resources into compliance with National Policy 43-101, and a study to determine an infill drill program to upgrade inferred resources.

Rimfire Minerals Corp. and Cangold Limited performed a trenching and drilling program on the **Thorn** gold-silver prospect (104K 031) that resulted in a significant discovery. Trenching in the Oban breccia with a helicopter-transported excavator was unable to expose mineralized bedrock but helped select drill targets in a strong multi-element soil anomaly. The fourth to eighth holes of an 8-hole program intersected heterolithic breccia with a black matrix containing pyrite, sphalerite and boulangerite. Current drilling indicates the zone is 50 to 70 metres wide with a 20-25 metre wide core of higher silver and gold grades. The discovery hole, THN03-19, collared in the zone and intersected 1.22 g/t Au and 103.2 g/t Ag over 38.6 metres including a higher grade interval of 1.97 g/t Au and 190.0 g/t Ag over 14.0 metres. Intensely altered Upper Cretaceous volcanic rocks and a related biotite-quartz-feldspar porphyry stock underlie the property. Earlier exploration focused on pyrite-tetrahedrite-enargite quartz veins up to 5 metres wide that contain significant to bonanza grades of silver, copper and gold. Continued drilling is anticipated. Thorn is 125 km southeast of Atlin, midway to Telegraph Creek.

Imperial Metals Corporation optioned claims to consolidate ownership over the Joss'alun copper discovery (104N 136) into the **Nak** project and undertook a comprehensive exploration program. The property is 75 km southeast of Atlin. Chalcopyrite occurs as massive pods and discontinuous veins that are interstitial to poorly developed pillows and lesser agglomerate in basalt of the Cache Creek Group. Pyrite and epidote are associated with chalcopyrite. Bodies of gabbro invade the mafic volcanic rocks and, based on their chemical similarity, are closely related. Along strike to the northwest, gabbro is host to the Jennusty and Bor copper showings. Faulted contacts between the gabbro and underlying serpentinized harzburgite appear to limit the potential of these latter zones. In the Joss'alun zone, geological mapping and soil geochemistry led to selection of drill targets (Photo 2). The zone did not respond to EM or magnetic surveys. All seven holes drilled in the Joss'alun zone returned significant copper values. The best intercepts are 0.94% Cu over 17.8 metres in hole 5, and 0.34% Cu over 53.4 metres in hole 7. Two holes in the Jennusty zone failed to intersect significant copper mineralization.

At the **New Polaris** property, across the Tulsequah River from the Tulsequah Chief project, Canarc Resource Corp. drilled 3 holes to test two deep targets beneath the

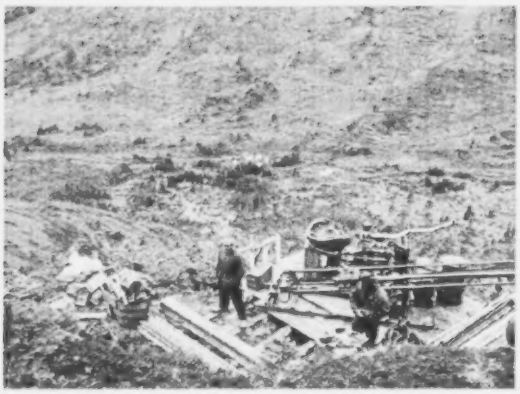


Photo 2. Nak property; drill crew ready to move to the next site in the Joss'alun copper zone, tent camp in the valley.

underground workings of the former Polaris mine (104K 003). The best intercepts were at relatively shallow depth. One returned 9.26 g/t Au over 5.7 metres beginning at 104.7 m in hole P03-2, and the other 17.48 g/t Au over 7.4 metres beginning at 24.1 m in hole P03-3. This final hole, which was 762 metres in length, crossed volcanic rocks of the mine sequence and intersected 14 auriferous quartz veins below the cited interval before it penetrated the terrane-bounding Limestone fault. The veins contain less than 10 g/t Au over widths of 2 metres or less, but may be parallel to the productive AB veins and worthy of follow-up. Canarc contracted a resource study to bring the reserve estimate into compliance with N.I. 43-101. In 1997 the company estimated geological resources of 3.7 million tonnes at 13.7 g/t Au. The company also undertook engineering studies of mining methods (longhole vs. shrinkage), underground access (ramp vs. shaft), the type of processing plant (concentrate shipment vs. bioleach) and transportation options. Metallurgical testing improved the estimated gold recovery from 90% to 97% in a sulphide concentrate.

Atlin Area

Forty kilometres west of Atlin, Eagle Plains Resources Ltd. optioned the **Titan** claims from Dennis Ouellette to explore a high-grade molybdenum showing. Molybdenum was discovered in the 1980's during investigation for precious metals based on showings two kilometres to the northeast (104M 037, 073). Quartz-molybdenite veins occur near the contact of a Cretaceous granodiorite with metasedimentary rocks in outcrops recently exposed by glacial retreat. Grab samples from outcrop and boulders assay up to 1.88% Mo. Two IP lines spaced 300 metres apart produced a strong anomaly that corresponds to the granite contact. Eagle Plains plans a drill program in 2004.

The **Yellow Jacket** (104N 043) gold prospect on Pine Creek in the Atlin placer district was acquired by Muskox Minerals Corp. Two holes were drilled in December, the beginning of a 20-hole program that will continue in 2004. Gold occurs in fault zones near the contact between serpentinized ultramafic and mafic volcanic rocks of the oceanic Cache Creek terrane. Drill programs in the 1980's by Canova Resources Ltd. and Homestake Mineral Development Corp. yielded many 10 to 35 g/t Au intercepts over widths up to 4 metres. Queenstake Resources Ltd. mined overlying stream gravels for placer gold.

Cassiar Area

Navasota Resources Ltd. completed geological mapping and a 13-hole drill program on the **Taurus** gold prospect under an agreement with International Taurus Resources Inc. The holes tested the bulk-tonnage potential of the 88 Hill area and of the Sable and Plaza vein systems (104P 010, 012). Auriferous quartz veins with minor base metal sulphides occur in carbonate-altered mafic volcanic rocks of the Sylvester Group. In the 88 Hill zone, holes COR-03-06 and COR-03-08 intersected 10 to 30 metre long core intervals averaging 0.7 to 1.0 g/t Au and narrow intervals of higher grade material, the best intersection was 4.74 g/t Au over 5.18 metres. In the Taurus West zone, hole COR-03-01 returned up to 37 metres of core length averaging between 1.0 and 1.7 g/t Au. In early 2004, Navasota announced it would not maintain its option on the property.

On the **Table Mountain** gold mine property, Cusac Gold Mines Ltd. explored for an eastern continuation of the productive Bain vein. Two holes were drilled but no results were announced. The drill program was terminated due to lack of funds; subsequent financing will permit drilling to resume in 2004.

On its **Magno** property near the Cassiar town site, Eveready Resources Corp. explored a series of vein and replacement showings in limestone of the Cambrian Rosella Formation and also a porphyry molybdenum prospect in the adjacent Cassiar batholith. Magno (104P 006) and Pant (104P 082) are massive sulphide replacement zones 1-2 metres wide containing arsenopyrite, sphalerite, galena, cassiterite, pyrrhotite, pyrite, magnetite and siderite. Targets for further work were identified at these showings and at Granite Creek (104P 081), a galena-sphalerite-pyrite vein where previous drill holes were oriented incorrectly (J. Pautler, pers. comm., 2003). The Ray molybdenum showing (104P 040) is restricted to a two-metre pegmatite pod but Eveready recognizes good potential south and east of the Storie porphyry molybdenum deposit (104P 069).

Kiniskan Area

After an eight-year hiatus, exploration and pre-development work resumed on the **Red Chris** copper-

gold porphyry deposit (104H 005). bcMetals Corporation Ltd. acquired an 80% interest in the property from American Bullion Minerals Ltd. and subsequently struck an agreement to acquire the remaining 20% interest and back-in rights held by Teck Cominco Limited. Red Chris is situated 15 km east of Highway 37 and 20 km southeast of the Tahltan community of Iskut. Copper-gold mineralization is contained in the Red Stock, an east-northeast elongated Early Jurassic monzodiorite that was emplaced into Hazelton Group volcanic rocks. The intrusion is less than 200 metres from the fault-bounded northern margin of the Bowser Basin. The distinct Main and East zones are some 500 metres apart. A quartz-pyrite-chalcopyrite stockwork with lesser bornite characterizes the Main zone, whereas densely sheeted veins typify the higher grade East zone. Morphology of the deposit is complicated by close-spaced conjugate faults and crosscutting 'barren phase' intrusions that closely resemble the mineralized phase.

The company completed a 41-hole program to upgrade resource classification, and to provide material for metallurgical testing and for acid-base accounting of waste rock. The objective of the metallurgical testing is to determine if gold recovery can be improved from circa 73% indicated by previous studies. An additional 8 holes were drilled for geotechnical purposes and test pits were dug in overburden to characterize construction materials. Based on new and previous drilling, bcMetals estimates resources above a 0.5% Cu cut-off grade to be:

- 29.8 million tonnes at 0.78% Cu and 0.66 g/t Au (Measured)
- 30.4 million tonnes at 0.63% Cu and 0.53 g/t Au (Indicated)
- 14 million tonnes at 0.56% Cu and 0.41 g/t Au (Inferred)

On October 27, 2003 bcMetals submitted a proposal to the Environmental Assessment Office to develop a 25 000 tonne per day open pit mine at Red Chris. The company aims to complete a feasibility study by September 2004 and, if results are favourable, to begin construction in early 2005.

The **GJ** (Kinaskan) property of Canadian Gold Hunter Corp. (formerly International Curator Resources Ltd.) is located 25 km west of Red Chris and 10 km from Highway 37. Exploration comprised grid-controlled geochemical and geophysical surveys that helped develop drill targets, and a 1300 line-kilometre airborne high-sensitivity magnetic survey to search for new zones. Splays of the Ealue Lake fault controlled emplacement of the Groat stock, the host to porphyry copper-gold mineralization at GJ (104G 034), Donnelly (104G 086, also known as Groat) and in the North zone, a poorly exposed area along the north contact. Compositionally, the Groat Creek stock is similar to the Red Stock. Work in these three areas between 1970 and 1990 included 52 diamond drill holes. Mineralized intervals consistently exhibit a high gold to copper ratio, for example, an intercept from the Donnelly zone of 0.70% Cu and 1.9 g/t Au over 68 metres and an intercept from the GJ zone of 0.36% Cu and 1.4 g/t Au over 72.6 metres. In 2003, overburden drilling through a widespread till blanket outlined a copper-gold anomaly that extends the Donnelly zone 700 metres beyond previous drilling. As well, in the North zone, new geophysical surveys found a 1500 metre-long anomaly with high chargeability and high magnetic response that corresponds with a soil anomaly. The best of five hand-dug trenches in the North zone returned 63 metres grading 0.20% Cu and 0.24 g/t Au and an additional 17.5 metres grading 0.54% Cu and 0.58 g/t Au. Drilling is planned in 2004. Two other targets tested returned poor results. The Blow-down occurrence (104G 171) at the east end of the exposed Groat stock, consists of narrow fracture veins in fresh intrusive rock, and at the Horn East occurrence (104G 177), a reconnaissance IP line across a gold soil anomaly did not detect high chargeability (A. Travis, pers. comm., 2003).

Turnagain-Upper Stikine Area

Canadian Metals Exploration completed a 23-hole drilling program on the **Turnagain** bulk-tonnage nickel project, 110 kilometres east of Dease Lake. Work focused on the Horsetrail zone (104I 119). The 3 by 8 kilometre Turnagain ultramafic body consists of serpentinized dunite, wehrlite, clinopyroxenite and hornblendite, all crystal cumulate phases. Wehrlite (clinopyroxene-bearing peridotite) and clinopyroxenite contain wide intervals of up to 10% disseminated, net-textured pyrrhotite, lesser pentlandite and minor chalcopyrite (Photo 3). The plutonic complex was emplaced into basinal sedimentary rocks of the Cache Creek Group that may be the origin of abundant graphite associated with these sulphide-rich intervals. Nickel grade is rather uniform; the 2003 drill holes contain 0.19% to 0.31% nickel over their full core length of 200 to more than 500 metres. Shorter intervals,

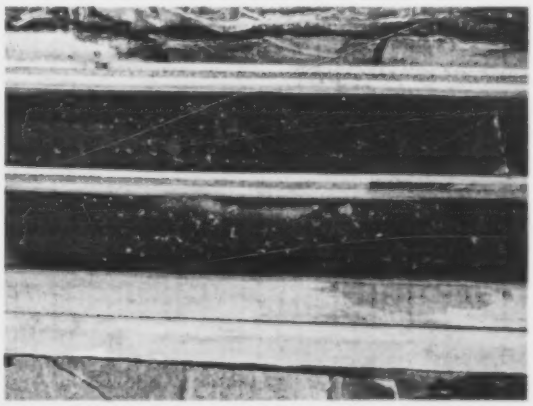


Photo 3. Turnagain property, drill hole 03-12, net-textured disseminated pyrrhotite and pentlandite in ultramafic rock.

10 to 70 metres wide, contain 0.3% to 0.4% Ni and the highest recorded intervals are 0.80% Ni, 0.29% Cu across 13.5 metres in hole 03-16 and 1.00% Ni, 0.15% Cu, 0.219 g/t Pt, 0.216 g/t Pd across 25 metres in hole 03-18. Geologic control and drill hole correlation of these higher-grade intervals has not been established. One core sample in ten is analyzed using a selective extraction with ascorbic acid. Results show that nickel is present primarily in sulphide minerals rather than in silicates (T. Hitchins, R. McCaffrey, pers. comm., 2003). Hitchins suggests that wallrock contamination resulted in a highly reduced magma that partitioned nickel into the sulphide phase.

The **William's Gold** property (94E 092), 140 km southeast of Dease Lake, was drilled by Stikine Gold Corporation. Gold occurs in arsenopyrite-bearing quartz veins within Paleozoic metavolcanic schist and mineralization may be related to a buried intrusion. Ten holes tested a gold soil anomaly and coincident low resistivity zone outlined by an IP survey. The anomaly measures 800 by 450 metres in size. Hole 03-10 cut three intervals from 0.6 to 1.4 metres wide grading 12 to 20 g/t Au within a 195-metre zone of sporadic metre-wide intervals containing more than 500 ppb gold. The other holes intersected fewer and weaker gold-bearing intervals. The final hole explored a separate soil anomaly to the north.

Hyder Gold Inc. acquired the **Tanzilla** claims 25 km southeast of Dease Lake to explore a mineralized belt (104I 022, 023, 102) for a VMS deposit similar to Eskay Creek. Stuhini and Hazelton group volcanic rocks and the Jurassic Snowdrift granodiorite pluton underlie the area. An eight kilometre-long belt of strong gossans is derived from stratigraphically controlled zones of advanced argillic alteration but no rhyolite was identified and the company concluded that the geologic setting is not comparable to Eskay Creek.

A 985-unit block of mineral claims near **Beale Lake** was staked by Sutcliffe Resources Ltd. to enclose the BLT claims, which the company optioned from David Fleming and Rudi Durfeld. The property, which is 75 km northeast of Dease Lake, is underlain by metamorphosed and tectonized continental margin strata of the mid-Paleozoic Kootenay terrane that are cut by the northeast margin of the Cretaceous Cassiar granite batholith. Gold occurs in quartz-arsenopyrite-pyrite-scheelite-galena veins (104I 098) with elevated bismuth. The target is a high-grade intrusion-proximal gold deposit, like the Pogo deposit in Alaska. Sutcliffe conducted a mid-fall soil geochemical survey, and a prospecting and geological mapping program but work was cut short by onset of winter conditions.

Iskut District

SpectrumGold Inc., 56% owned and managed by NovaGold Inc., reactivated exploration of the **Galore Creek** porphyry copper-gold deposit (104G 090), one of the principal undeveloped mineral resources in the Province. Discovered in 1960, the property is located 75 km west of Bob Quinn. Galore Creek was re-appraised in 1991 and 1992 by Kennecott Exploration, which estimated a measured and indicated resource of 243.2 million tonnes grading 0.75% Cu, 0.45 g/t Au, 6.0 g/t Ag plus an inferred resource of 70.6 million tonnes grading 0.59% Cu, 0.63 g/t Au, 6.0 g/t Ag. The estimate is based on nearly 500 drill holes totaling over 100 000 metres of core. Alkaline volcanic rocks of the Stuhini Group and comagmatic syenite intrusions and related breccias host the Galore Creek copper-gold deposit. SpectrumGold acquired the property from subsidiary companies of Rio Tinto plc and Anglo American plc. New drilling confirmed previous grades and revised understanding of ore controls (Photo 4). Characteristics of mineralization are intermediate between those of skarn and porphyry deposits (J. Muntzert, pers. comm., 2003). Unlike a typical porphyry deposit, there is very little stockwork veining. Chalcopyrite occurs as massive zones and disseminations and pyrite content is low. As in many skarn deposits, copper and gold are concentrated as replacement zones in limy horizons and accompanied by abundant garnet. As in most porphyry deposits, alteration includes K-feldspar flooding, hydrothermal biotite and magnetite, and there are cross-cutting anhydrite veins. The eight holes drilled by SpectrumGold were distributed in four sub-zones throughout the deposit and were drilled as angle holes to clarify gold distribution. Prior drilling employed mainly vertical holes and focused on copper distribution. A 30 000 metre drilling program is planned for 2004. It will explore for new ore zones and continue to study ore controls in known zones by using oriented core.

Photo 4. Core logging at Galore Creek.

The program will include exploration of the Copper Canyon alkalic porphyry copper-gold deposit (104G 017), 10 km to the northwest, acquired under a separate agreement with Eagle Plains Resources Ltd. Other planned work includes an access study, gold metallurgical testing, and assessment of on-site hydroelectric power generation potential.

Roca Mines Inc. worked on its **Foremore** property (104G 148), a gold and volcanogenic massive sulphide prospect located 45 km west of Bob Quinn. Geological mapping of the host deformed Devono-Mississippian volcanic and sedimentary rocks that comprise the basement assemblage of Stikine Terrane, continued under a partnership program with the B.C. Geological Survey. This work determined the probable source area of the southern mineralized boulder field, the stratabound SG mineral zone, which was discovered in 2002, lies on the south flank of a two kilometre-long rhyolite dome. The best channel sample in the SG zone graded 2.34% Pb, 6.69% Zn, 42.9 g/t Ag, 0.11 g/t Au across 1.82 metres but the four holes drilled through the horizon returned lower grades. An EM survey delineated a 200 metre-long conductor that extends north along strike from the SG showing. The company plans to explore the conductor by drilling in 2004. Three kilometres west, prospecting discovered the BRT showing (Photo 5) upslope from the north boulder field, an area of mineralized boulders at the northern terminus of the More glacier. Two outcrop channel samples across laminated, massive to semi-massive pyrite layers with lesser chalcopyrite, sphalerite and galena assayed 0.73% Cu, 0.94% Pb, 6.34% Zn, 189.7 g/t Ag and 2.75 g/t Au across 2.05 metres and 0.11% Cu, 4.27% Pb, 9.52% Zn, 161.9 g/t Ag and 2.03 g/t Au across 2.80 metres. Seven holes were drilled from three sites. A zone of massive to semi-massive pyrite, but no other base metal sulphides, was encountered in one hole; it returned an assay of 7.9 g/t Au, 22.6 g/t Ag, <0.1% Cu and 0.1% Zn over 2.3 metres. Drilling determined that the BRT zone is contained within a felsic tuff between carbonaceous sedimentary and overlying mafic volcanic rocks. Elsewhere on the Foremore property, Roca prospectors discovered the Wishbone zone, another train of mineralized boulders. Quartz-carbonate vein material contains interesting amounts of copper, zinc, silver and gold. In the Sunday zone, Roca explored widely spaced fractures filled by gold-bearing arsenopyrite, sphalerite and galena.

In addition, Roca Mines Inc. optioned the **PBR** claims from Barrick Gold Corp. in order to deepen a hole drilled in 2001 that stopped short of testing the Eskay Creek horizon. The PBR claims are underlain by a thick sequence of pillow basalts that correlate with similar rocks at Eskay Creek. There they mark the restricted rift basin in which the Eskay massive sulphide deposits accumulated (the 'Eskay Rift'). Stream sediments at PBR are anomalous in Eskay Creek pathfinder elements (Au, Ag, Hg, As, Sb, Zn). Interpretation of displacement by the Forrest Kerr and Iskut River faults suggests PBR is 15 kilometres along strike from the Eskay Creek gold-silver deposit, with movement removed. The drill hole was deepened from 1420 to 1770 metres and intersected interlayered basalt and variably pyritic mudstone. Arsenopyrite occurs as disseminated needle-shaped crystals in a two-metre interval of mudstone, a mode of occurrence found proximal to gold-silver zones at Eskay Creek. Although no significant assays were obtained, the company is encouraged and proposes to employ down-hole geophysics to derive a target for a wedge off-cut hole.

Photo 5. John Mirko (director, Roca Mines Inc.), Sandy Sears and Jen Stronge examine the new BRT volcanogenic massive sulphide showing.

Heritage Explorations Ltd. continued exploration of its extensive mineral claim holdings that surround the Eskay Creek mine property. Seven holes were drilled in the Hexagon zone, a target derived from high-energy stream silt samples collected in 2002. The zone is located near the eastern boundary of the **SIB** claims within the Betty Creek Formation, a lower stratigraphic level than has been considered prospective by past explorers for Eskay Creek type mineralization. The company is encouraged by a wide zone of pyrite-sericite alteration that has been traced more than 4 kilometres along strike and is up to 185 metres wide in core; it contains elevated silver, mercury, arsenic and locally gold values. Heritage completed three drill holes on the **Bonsai** prospect (104B 383) optioned from Teuton Resources Corp., where beds of mudstone-hosted massive to framboidal pyrite are in close proximity to bodies of rhyolite. The best intersection obtained by Heritage was 0.38 g/t Au, 27.1 g/t Ag across 64 metres within brecciated rhyolite. Two holes drilled in the Pie Area on Battleship Knoll, followed up a 2002 intersection. Drill hole 03-126 intersected 7.32 g/t Au, 16.7 g/t Ag over 0.9 metres within an intra-rhyolite mudstone. Two additional holes on the SIB claims tested two large IP anomalies that correspond to

the intersection of this mudstone horizon with a northwesterly structure. No significant values were obtained. Prospecting and mapping on the Treaty Creek property identified three drill targets but, due to poor late-summer weather, drilling was postponed until 2004.

On the **Rest** claims, Northgate Exploration Limited conducted geological mapping, prospecting and geochemical sampling in search of an Eskay Creek type deposit. The Rest claims are located in the 'Eskay Rift' between the PBR and RDN properties. Results were disappointing and no work is planned in 2004.

Goldrea Resources Corp. and Golden Chalice Resources Inc. explored the Ernie Creek zone on the **BX** claims, 6 km southeast of the former Snip gold mine. Noranda Exploration Inc. drilled two holes that targeted shear-hosted, gold-bearing quartz veins in 1990-1991 on what is now the BX-10 claim but the Ernie Creek zone is not listed in Minfile. Gold is associated with minor pyrite, chalcopyrite and arsenopyrite. Chip sampling in 2003 returned up to 28.56 g/t Au across 0.5 metres but none of the three drill holes intersected economic mineralization.

Noranda Exploration Inc. carried out reconnaissance geological mapping and sampling on the **Kerr-Sulphurets** property acquired from Seabridge Gold Inc. The property contains the Kerr porphyry copper-gold deposit and the Sulphurets gold zone. Work will continue in 2004, and may include core drilling.

The **Schaft Creek** porphyry copper deposit (104G 015) was acquired by 955528 Alberta Ltd., a private company, but no work was done. Similarly, Hathor Exploration Ltd. did no work on its extensive claim holdings in the Eskay Creek - Granduc area.

Stewart District

Canadian Empire Exploration Corp. acquired the **Big Bulk** porphyry copper-gold prospect (103P 016) under an agreement with Teck Cominco Limited. On the property, a hornblende-feldspar porphyry monzonite invades intermediate Hazelton Group fragmental volcanic rocks on the shore of Kinskuch Lake, 50 kilometres southeast of Stewart. Both the pluton and country rocks are cut by a fracture stockwork of quartz-chalcopyrite veins with associated potassium feldspar flooding in the core, to peripheral chlorite-pyrite-chalcopyrite veins with associated epidote alteration (B. Thurston, pers. comm., 2003). The best copper and gold grade occurs within a 1250 metre by 300 metre area of the chloritic zone. A saw-cut sample across a portion of the zone assayed 0.89% Cu and 0.83 g/t Au over 70 metres. The first five holes were drilled in this target (the Bonnie zone) and included the best intercepts of the program,

- 0.68% Cu and 0.41 g/t Au over 12.2 m in BB03-01
- 0.79% Cu and 0.58 g/t Au over 21.3 m in BB03-02
- 0.64% Cu and 0.42 g/t Au over 27.4 m in BB03-03

One hole was drilled 800 metres to the east but it did not intersect significant copper-gold mineralization. Two holes located on an island 250 metres to the southwest yielded lower grade material, for example, 0.45% Cu and 0.18 g/t Au over 9.1 metres. In outcrop 400 metres southwest of the Bonnie zone, coarse gold was discovered in a flat-lying, late-stage quartz-epidote-chlorite vein cutting the potassic core of the alteration system. No economically significant assays were obtained in three drill holes beneath the surface exposure.

Bravo Venture Group Inc. acquired the **Homestake Ridge** property at the head of the Kitsault River, 30 km south of Stewart. The company focused its drill program primarily on structurally controlled gold mineralization (103P 216) in the Goldslide pluton rather than exploring for a precious metal enriched VMS deposit as Teck Cominco Ltd. sought. Six 2003 holes tested a zone of quartz-pyrite stockwork veining and breccia at the contact of the feldspar-hornblende porphyry stock where previous workers collected a 10.5 metre trench sample that assayed 18.2 g/t Au, 60.0 g/t Ag and 3.5% Cu. At a depth of 160 metres below the trench, drill hole HR03-06 intercepted a 3.05 metre interval of 9.8 g/t Au and 9.8 g/t Ag. The geologic setting and mineralization, with local sphalerite, galena and chalcopyrite, is comparable to deep portions of the Silbak Premier deposit. Bravo Ventures drilled five additional holes to test four other targets: the rhyolite – argillite contact formerly explored by Teck Cominco, the Silver Crown zone (103P 082), and the Fox-Gold Reef zone (103P 093, 103P 213), and the Dilly vein. No significant assays resulted.

The **FH** claims are also in the Kitsault area, 55 kilometres southeast of Stewart and 8 kilometres northeast of Alice Arm. The property includes the Red Bluff porphyry copper-gold target (103P 160). Energulf Resources Inc. outlined a strong rock and soil copper-gold geochemical anomaly over an area of 300 by 1000 metres that overlies a dike-shaped diorite body and Hazelton Group volcanic rocks. In 1992, Noranda Inc. reported a chip sample containing 2214 ppm Cu and 265 ppb Au over 20 metres (AR 22641).

Praxis Goldfields Inc., a private company, continued to explore for volcanogenic massive sulphide (VMS) mineralization on its **Praxis** property near the Portland Canal, 25 km south of Stewart. Interest is focused on a 370-metre thick, pyrite to pyrrhotite-rich rhyolite that varies in texture from flow-banded to fragmental. Isotopic dating indicates that it is 176 Ma, making it correlative to Eskay Creek. Three drill holes tested the rhyolite and an underlying 300-metre thick sequence of thin-bedded argillite that contains wispy laminations of syngenetic pyrite and pyrrhotite (D. Hanson, pers. comm., 2003). Locally, the argillite contains chiastolite, a variety of the metamorphic mineral andalusite. Beneath the argillite, a

distinctive, heterolithic andesite breccia about 40 metres thick separates the sedimentary unit from a thick sequence of pillow basalt and implies proximity to a volcanic center. Minor base metal mineralization was encountered in the andesite breccia in 2002 and 2003. No 2003 drill results have been reported but additional drilling is planned for 2004.

On the **Del Norte** property 34 km east of Stewart, Lateegra Resources Corporation, under terms of an agreement with Teuton Resources Corp., intersected the LG vein (104A 161) in seven of ten holes drilled. LG is a steeply dipping, quartz-calcite breccia vein about one metre thick that contains pyrite, sphalerite and galena. The host rock is an argillite near the base of the Salmon River Formation. A fan of four holes was collared from a site 3 to 4 metres from the vein. Intersections ranged from 3.19 to 13.92 g/t Au and 242 to 565 g/t Ag across apparent widths of 1.86 to 3.05 metres. A fan of three holes was drilled from a second site 200 metres north and set back about 35 metres from the vein. These holes returned higher grades over narrower widths; grades ranged from 11.55 to 15.46 g/t Au and 1177 to 2619 g/t Ag across apparent widths of 1.0 to 1.5 metres. No significant mineralization was intersected by two holes collared from a third site 50 metres south of the first site, and the final hole did not reach target depth. The LG vein has been traced for 550 metres on surface and likely correlates with the Kosciuszko vein 475 metres further south across a snowfield. Drill core assays from the geologically similar Kosciuszko vein were reported in *Exploration and Mining in BC – 2002*.

Lateegra Resources Corporation also worked on the **Clone** property, 18 km south of Stewart. Clone (103P 251) is a gold-bearing braided shear zone on a nunatak in the Cambria icefield. In 1996, Teuton Resource Corp. and Minvita Enterprises Ltd. drilled 95 closely spaced core holes and blasted 140 rock trenches over a distance of 400 metres (*Exploration and Mining in BC – 1996*, page B9). A number of holes produced bonanza-grade intercepts. The shear zone weakens and is obscured by permanent snowfields to the northwest and disappears beneath a valley glacier to the southeast. In 2003 Lateegra drilled an additional eight holes; four tested the shear zone and three yielded high-grade assays. The most spectacular intersection was in CL03-2, which twinned a 1996 hole, and intersected 80.80 g/t Au over an apparent width of 8.47 metres.

Seabridge Resources Inc. commissioned an independent engineering study of the **Red Mountain** gold deposit (103P 086) located 18 km east of Stewart on the margin of the Goldslide diorite to granodiorite pluton. Based on a resource of 1 261 600 tonnes grading 9.14 g/t gold and 28.7 g/t silver, the best development options were determined to be:

- A seasonal (May-October), 1000 tonne per day, trackless mine using the existing portal at 1870 metre elevation and a new portal at 1650 metre elevation,
- On-site milling using conventional grinding and cyanidation (CIP) circuits,
- Subaqueous tailings disposal in Red Mountain cirque and
- Road access to the mine using the route designed in 2001 by North American Metals, previous owner of the property.

Capital cost is estimated to be Cd $61.8 million.

Mountain Boy Minerals Ltd. cored 20 drill holes on the **Georgia River** gold vein prospect (103O 013), 13 km south of Stewart. A series of quartz-sulphide veins fill shears and related dilation zones in Hazelton Group volcanic rocks. Previous work on the Southwest vein comprised trenching, 81 diamond drill holes and drifting on two underground levels over a total length of 600 metres and vertical range of 260 metres. The company claims an indicated resource of 130 000 tonnes grading 19.2 g/t Au and an inferred resource of 53 700 tonnes grading 16.9 g/t Au. Eight of the 2003 Mountain Boy drill holes tested the northeast trending Summit vein at its intersection with the Main vein. The best intersection came in the first hole, 22.61 g/t Au and 13.2 g/t Ag over 1.07 metres. Twelve other holes tested the northeast trending Southwest and Bullion veins, where the Gem vein intersects them. These holes cut altered and silicified rocks but no significant gold values. Mountain Boy Minerals also drilled one short hole at Dunwell (103P 052), a past producer of precious and base metals 7.5 km northeast of Stewart.

Valgold Resources Ltd. acquired the **Horseshoe** (Marmot) property, 12 km south of Stewart, from Rick Kasum. Valgold appraised a series of previously explored, precious metal-bearing quartz sulphide veins. The Engineer (103P 103), Washington (103P 104) and Prince George (103P 107) veins lie in the hornfels margin of the Hyder pluton, part of the Coast Range plutonic complex.

Terrace-Kitimat Area

Eagle Plains Resources Ltd. acquired the 500-unit **Kalum** property 35 km northwest of Terrace to cover the Allard stock, a 4 km by 11 km intrusion that has been mapped west of Kitsumkalum Lake. High-grade gold-bearing quartz veins fringe the Allard stock near its contact with Bowser Lake Group country rocks. The stock consists of hornblende-biotite granodiorite to diorite and is marked by a strong magnetic anomaly that extends south of the mapped extent of the stock. Though it is not

isotopically dated, Gareau and Woodsworth assigned an early Tertiary age to the Allard stock based on their regional mapping (Current Research 1997-A, Geological Survey of Canada, p. 47-55). Further, they describe it as a composite pluton with an eastern syenitic phase that is "dissimilar to any other [intrusion] in the map area". Eagle Plains did not recognize this second phase. The stock is bordered by a weak contact metamorphic and metasomatic aureole 100 to 300 metres wide (J. Stephens, pers. comm., 2004).

Eagle Plains conducted a property-wide program to evaluate known showings and discover new areas of gold-silver mineralization. It involved geological mapping, prospecting, rock grab and channel sampling, and stream sediment and soil sampling. Targets will be prioritized and drilling is anticipated in 2004. Most historic work was carried out at the east end of the Allard stock. In the 1940s a small tonnage of ore with a recovery grade of 49.6 g/t gold was shipped from the low-sulphide **Kalum** quartz vein (103I 019). Further work in the 1980s defined a small resource grading 16.1 g/t gold. Along the north contact of the pluton, Eagle Plains delineated a gold soil anomaly over a distance of 4.5 km between the **Chris** (103I 174) and **Martin** (103I 020) showings (Photo 6).

Photo 6. Julian Stephens sampling the Chris gold-bearing quartz-arsenopyrite vein.

Also in the 1980s, trenching and drilling of the Chris quartz-arsenopyrite vein showed an average of 11.3 g/t Au and 80.6 g/t Ag across 0.6 metres along a 300 m strike length. The Martin showing comprises two parallel, sulphide-rich veins with comparable gold content. Abundant sulphides include pyrrhotite, pyrite, arsenopyrite, galena and sphalerite. Neither the Martin vein nor the intervening ground has been drilling tested. At the northwest end of the Allard stock, work on the **Hat** (103I 173) and nearby veins confirmed previous results and discovered new veins. For example, the Pick vein assayed 4.8 g/t Au, 380 g/t Ag across 0.7 metres and the new 5000 vein returned 6.1 g/t Au, 17.3 g/t Ag across 1.0 metre. The veins contain arsenopyrite, galena, chalcopyrite sphalerite and pyrite. Midway between the Martin and Hat occurrences, the newly discovered Tojo zone consists of an area of sheeted quartz veins over a 30 by 80 metre area within granodiorite. The best grab sample graded 73.1 g/t Au and 495.4 g/t Ag. About 1 kilometre south of the Hat/Pick zone, along the western contact of the stock, soil sampling and prospecting located several areas with multiple quartz veins. Among these, the Rico vein returned a best sample of 11.0 g/t Au over 2.5 metres. Another new showing, the Tuppie zone was discovered in the hornfels carapace above the pluton in the west-central area of the property. Drusy quartz-cemented breccias and narrow comb-textured quartz-sulphide veins are associated with aplite and vein-dikes. Grab samples from the sulphide veins contain up to 2.8 g/t Au and 975 g/t Ag. Julian Stephens (pers. comm., 2004) notes that the Allard magma is weakly oxidized, and mineralization is relatively high in silver, lacks bismuth, and is associated with propylitic, argillic and silicic alteration. Consequently, Eagle Plains concluded that the principal exploration target is an epithermal gold-silver vein deposit rather than a gold deposit related to a reduced granitic intrusion, like Fort Knox. An airborne resistivity, magnetic and electromagnetic survey is planned in 2004.

Babine Area

The **Morrison-Hearne Hill** project of Pacific Booker Minerals Inc. entered the Environmental Assessment Process with a proposal to develop a 20 000 to 25 000 tonne per day open pit mine. The initial meeting was held in Smithers on October 20. The Morrison porphyry copper-gold deposit (93M 007) is located 65 km northeast of Smithers and is centred on an Eocene biotite-feldspar granodiorite porphyry stock. Measured plus indicated reserves were determined by E. Kimura, P.Geo., to be 12.4 million tonnes at 0.53% Cu, 0.26 g/t Au (at 0.3% Cu cutoff and 0.75 strip ratio) in a starter pit, within an ultimate pit with 62.1 million tonnes grading 0.46% Cu, 0.22 g/t Au (at 0.3% Cu cutoff and 1.15 strip ratio). To close off gaps in the resource base, and for hydrologic and geotechnical assessment, Pacific Booker drilled eight holes in 2003, bringing its total in the Morrison deposit to

90. Other studies include surface water flow and quality, ore and waste rock acidity, fisheries potential, and evaluation of tailings disposal sites. Pacific Booker proposes to begin a full feasibility study in early 2004. Under terms of its agreement with Noranda Inc., Pacific Booker must complete the study by October 31, 2005.

On the west side of Babine Lake, south of Granisle, Lee Foster undertook a program of rotary drilling with a truck-mounted rig on the Big and Paul claims. A total of thirteen 20 to 60 metres deep holes were drilled. Those on the Paul claims did not reach bedrock.

Further north in the Skeena Mountains 160 km from Smithers, Kodiak Resources Inc. (formerly International Kodiak Resources Inc.) carried out an IP survey and drilled five core holes on its **Tommy Jack** (94D 031) property. The holes tested a 2.1 km long and 100 to 300 metres wide zone of high chargeability that coincides with soils anomalous in silver, gold and base metals, and includes the original showing on Tommy Jack Creek. The holes are aligned in a northeast fence across the anomalous zone. Drilling encountered Bowser Lake Group sandstone, greywacke and shale and rare altered dacite dikes, all cut by quartz-carbonate veins. Three veins sets are recognized (S. Wetherup, pers. comm., 2003) and contain galena, sphalerite, pyrite and arsenopyrite. One vein-set is associated with northwesterly graphitic shears that are normal faults with southwest side down offsets. Two of the best intercepts are 2.04 g/t Au, 138.5 g/t Ag over 10.2 metres in TJ03-03 and 31.70 g/t Au, 0.93 g/t Ag over 1.2 metres in TJ03-05.

Houston-Tahtsa Area

The **Seel** claims, which cover the Lean-To porphyry copper prospect (93E 105) 110 km south of Houston, were acquired by Grayd Resource Corp. from prospector Rupert Seel. Grayd conducted geological mapping, prospected and compiled previous drilling results. Mineralization consists of a quartz-chalcopyrite stockwork that is related to an Eocene intrusion. Mineralization is younger than other porphyry deposits in the Tahtsa district, such as Huckleberry and Whiting Creek. Sampling at Seel showed up to 1.6 g/t gold, higher than values in the Cretaceous porphyry deposits. The target was expanded to an area 7 km long by 1-2 km wide but the company was unable to finance IP and drilling programs.

Three claim groups were staked 5-10 km south of Houston. The 64 unit **Bob Creek** property was acquired by Royal Country Minerals Corp., then transferred to International Curator Resources Ltd., which subsequently changed its name to Canadian Gold Hunter Corp. The company was unable to locate important drill logs or core from previous work on the Bob Creek epithermal gold-silver prospect (93L 009) so deferred its proposed fall drilling program to 2004. The 210-unit **Buck** property adjoins Bob Creek to the south and includes a silver-base metal occurrence (93L 265). A private company, United Mineral Services Ltd., acquired the claims and conducted a 40-kilometre reconnaissance IP survey that yielded several chargeability anomalies. Nearby, Lorne Spence acquired the 36-unit **Low** claims, which adjoin the Silver Streak silver-copper showing that he optioned from prospectors Ed and Jerry Westgarde and Barry Hofsink. No work was done.

In the Nechako Plateau near Intata Reach, 110 km southeast of Houston, Southern Rio Resources Ltd. staked the **Sam** claims to cover the Rhuhbarb epithermal gold-silver showing (103F 054). Limited work was done as the company focused on the 3Ts property further east.

INDUSTRIAL MINERALS AND GEMSTONES

Fireside Minerals Ltd. produced 10 000 tonnes of barite from the Bear pit on the **Fireside** property (94M 003), which is 125 km east of Watson Lake. Coarse, white barite comprises a fault-controlled vein within rocks of the lower Paleozoic Kechika Group. The vein strikes east-northeast and dips steeply north. Deepening of the Bear pit showed the vein increases in width to 10 metres (Photo 7). To the north, the vein cuts buff-brown phyllite and to the south it crosses black siltstone and quartzite that is fractured and in-filled by quartz and calcite. Run-of-mine material was concentrated using jigs at the mine site, then trucked to Watson Lake where the barite was ground, bagged and sold to the western Canadian oil and gas drilling industry. Exploration drilling below the Bear pit is planned early in the 2004 season.

Photo 7. Mining the 10-meter wide Bear barite vein on the Fireside property.

Nephrite jade was produced from three properties; **Cassiar** (104P 005), **Polar Jade** (104I 083) near Serpentine Lake, and **Kutcho Creek** (104I 078). Cassiar Jade Contracting Ltd. mined Cassiar, and Polar Gemstones Ltd. operated the other two deposits. The Jade West Group markets all the jade, mainly to Chinese and Korean buyers.

On the **Xeno** property (94L 017) Pacific Ridge Exploration Ltd. carried out additional surface sampling aimed at characterizing rocks associated with a microdiamond it recovered from an earlier sample. The diamond, 0.38 by 0.30 by 0.25 mm in size, was obtained from a 32 kg sample of an ultramafic diatreme dike. The Xeno claims cover a complex of Paleozoic alkalic rocks and carbonatite 15 kilometres west of the Rocky Mountain Trench that occur in an area underlain by continental crust. Access is by helicopter, 140 kilometres east from Dease Lake. The B.C. Geological Survey (Simandl, *Geological Fieldwork, 2003*) also investigated the area to search for kimberlite indicator minerals (Photo 8).

Photo 8. George Simandl, B.C. Geological and Development Branch, examines heavy mineral concentrate for diamond indicator minerals on the Xeno property.

PLACER MINING

Interest in placer mining rose as the price of gold climbed late in the year and more activity is expected in 2004. However, due to staff reductions in the Ministry of Energy and Mines, it is not possible to present a comprehensive report of placer gold mining in the region, so comments here are limited to two areas.

In the Atlin district, **Ruby Creek** continued to be the principal area of activity. A joint venture between Sisters Resources, a private company, and Main Street Mining Ltd. drove an adit on the left bank of the creek beneath the Ruby Creek olivine basalt lava flow to mine the creek paleochannel from underground. The adit was collared from the floor of the pit dug by Sisters Resources in 2002. Unfortunately, the pit was not economically viable (see *Exploration and Mining in BC – 2002*). The chilled base of the lava flow is very strong, and supports an open stope measuring some 60 metres long by 20 metres wide and 6 metres high. Interestingly, the base of the flow preserves the texture of the bed of ancient Ruby Creek, including the cast of a 5-metre boulder. Five to six miners had extracted more than 9000 cubic metres by mid-season (G. Turner, pers. comm., 2003). There was no activity upstream from the Sisters-Main Street JV where West Coast Paving Co. Ltd. and Westrail Construction operated in 2002. Downstream of the underground placer mine, Pelly Construction Ltd. expanded the Ruby Gold pit by another setback of the pit high wall. Mining encountered a granite bedrock 'high' that deflected the paychannel. Mining results were disappointing as paydirt was thinner and lower grade than expected.

Thibert Creek continued to be the most active in the Cassiar district.

COAL PROJECTS

Fortune Minerals Limited is preparing new resource estimates and a revised computer block model for the Lost-Fox deposit on the **Mount Klappan** anthracite coal property (104H 020, 021, 022). An updated feasibility study is planned for 2004. Fortune Minerals contemplates a mining rate of one-half to two million tonnes per annum, and will market premium coals for water purification, cooking briquettes and metallurgical applications. The announced acquisition of BC Rail Ltd. by Canadian National Railway Company may facilitate development of Mount Klappan. A railway sub-grade, constructed decades ago, passes through the property and track is installed to within 70 km of these coal deposits.

ACKNOWLEDGEMENTS

I sincerely thank prospectors, geologists and engineers, and mine staff for their hospitality while visiting their exploration projects and mines. This report would not be possible if they did not share information, and their input is gratefully acknowledged. Jan Chan, Mineral Titles Branch, kindly provided claim statistics. I also greatly appreciate the help of co-workers in the Mines office, Doug Flynn and Bruce Graff.

NORTHEAST-CENTRAL REGION

By Bob Lane, PGeo

Regional Geologist, Prince George

SUMMARY

Mineral exploration activity in the Northeast-Central region continued its upward trend in 2003 and reached the highest level since 1996. A much improved investment climate, significantly higher precious metal and base metal commodity prices, and strengthening coal markets all contributed to the recovery. Exploration expenditures jumped to an estimated $16.2 million, up from $10.9 million in 2002, and the amount of diamond drilling increased by one-third to about 91 000 metres.

The Wishbone copper-gold zone was the most significant metal discovery made during the year. Wishbone is a well-mineralized hydrothermal breccia that is part of the Mount Polley alkalic porphyry system, near Likely in the Cariboo. Other promising discoveries were the Sickle Creek epithermal vein system on the Pine property and the WG-Gold zone on the Pil property, both in the Toodoggone camp.

The largest exploration drilling program in the region targeted porphyry copper-molybdenum mineralization on the Gibraltar mine property, near McLeese Lake in the Cariboo. Other major metal exploration projects sought gold-enriched porphyry copper deposits, and moderate to high-grade gold vein and replacement systems, including skarns and mantos.

The Kemess North gold-copper deposit was advanced toward a full feasibility assessment, and by the end of the year had entered the province's Environmental Assessment process. A 10 000 tonne underground bulk sample project commenced at the high-grade Bonanza Ledge gold deposit on the Cariboo Gold Quartz property. Several other advanced stage projects in the Peace River Coal Fields are moving toward feasibility, including the Perry Creek (Wolverine) coal project.

Two major open pit mines operated during the year. The Kemess South operation continued to reduce its overall mining costs while increasing throughput and gold and copper production. Higher average gold and copper prices contributed to the success of the operation. Production of gold from the Kemess South mine has now exceeded that of any other British Columbia gold-producing porphyry deposit. Production at the Bullmoose coal mine ended in early April, 2003. During its 20-year operating life, the mine produced and exported approximately 34 million tonnes of high quality metallurgical coal. During its lifetime, the mine played a major role in the economic development of the Tumbler Ridge area. Several small-scale mines operated intermittently during the year. They included the Shasta silver-gold mine, the Nazko lava rock quarry, the Giscome limestone quarry and the Ahbau railroad ballast quarry.

EXPLORATION TRENDS

An estimated $16.2 million was spent on exploration in the region (Figure 1) during 2003. This figure is a major increase from last year's total of $10.9 million, and marks the fourth consecutive increase in annual exploration expenditures for the region. Exploration drilling totaled 90 835 metres in 2003, about 21 000 metres more than last year (Figure 2), again illustrating the four-year positive trend.

In 2003, claim staking in the region was significant. The 6197 mineral claim units staked during the year (Figure 3) were the most since the year 2000, when a staking rush in the Wells-Barkerville area resulted from announcement of the Bonanza Ledge high-grade gold discovery. In 2003, the Toodoggone camp was particularly active with more than 2200 units staked. Only 3189 mineral claim units were forfeited in 2003, the fewest in the last decade. A total of 460 placer claim units were staked while only 222 were forfeited. The 31 coal licenses acquired in the Peace River Coal Fields during the year covered more than 8600 hectares; only 12 were forfeited.

The increase in gold price beyond US$400 by year's end, and improving silver and base metal prices contributed strongly to rejuvenation of exploration in the region. The search for gold-bearing mineral deposits accounted for about 74% ($12.4 million) of the exploration dollars spent in the region (Figure 4).

The locations of operating mines, major exploration projects and smaller exploration projects that are believed to have regional significance are shown on Figure 5. There were 19 major exploration projects (those that involved mechanical disturbance and expenditures in excess of $100 000) carried out in the region in 2003 (Table 1), three fewer than in 2002. Eight of the major programs explored epithermal or mesothermal gold deposits; five evaluated gold-enriched porphyry copper systems; three targeted auriferous skarn mineralization; one targeted copper-molybdenum mineralization; another examined a volcanic redbed copper deposit; and three were major coal projects.

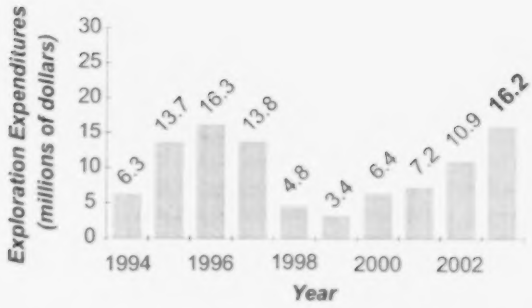


Figure 1. Annual exploration expenditures, Northeast-Central Region.

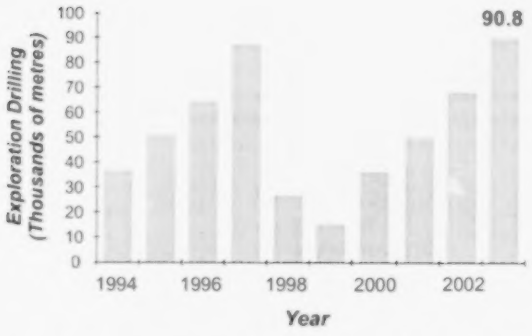


Figure 2. Annual exploration drilling, Northeast-Central Region.

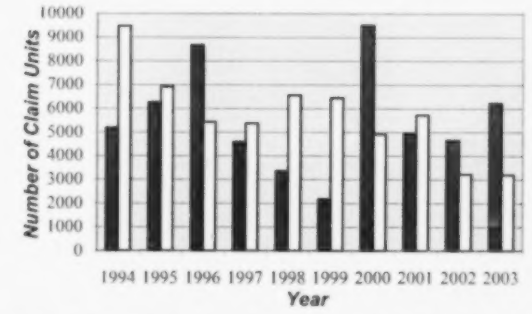


Figure 3. Number of mineral claim units staked (dark bars) versus mineral claim units forfeited (light bars) by year, Northeast-Central Region.

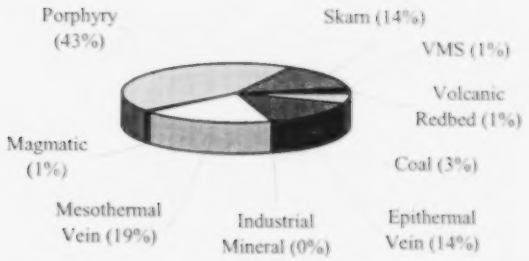


Figure 4. Exploration spending by deposit type (expressed as a percentage of the $16.2 million total spent in the region).

EXPLORATION PROJECTS

Toodoggone Camp

Exploration activity in the Toodoggone camp continued to increase in 2003—it was the busiest the region has been for many years. Companies targeted both bulk tonnage gold-copper deposits and epithermal gold-silver systems associated with Early Jurassic calc-alkalic intrusions. A major, jointly funded government-industry geophysical survey (gamma ray spectrometer and magnetometer) covered part of the mineral-rich belt in the Toodoggone Camp. Five industry partners contributed funding, and Natural Resources Canada (NRCan) provided staff with geophysical expertise and funding from the Targeted Geoscience Initiative (TGI). At least three companies staked new claim blocks in anticipation of positive survey results. The survey results will be released in April 2004.

Northgate Exploration Ltd. continued its detailed appraisal of the bulk tonnage **Kemess North** (094E 021) porphyry gold-copper deposit (Photo 1) located about 5.5 kilometres north of the Kemess South open pit. Work included oriented core, geotechnical and condemnation drilling, and environmental studies (in support of pre-feasibility and feasibility studies that are required by government as the project enters the Environmental Assessment process). The advanced work identified a 'mineable resource' for the Kemess North deposit of 369 million tonnes grading 0.34 g/t Au and 0.18% Cu. The proposed development schedule calls for infrastructure development in 2005, pre-stripping of the deposit in 2006 and mining of ore by the end of 2006. The Kemess North and Kemess South deposits would be mined concurrently until reserves at Kemess South are exhausted in 2009. Mining at Kemess North would continue until 2019. During the final 10 years of operation, annual mill throughput would increase to 34 million tonnes and metal production would average 223 000 ounces of gold and

117 million pounds of copper. The estimated initial capital cost of the project is $126 million.

Northgate also completed more than 10 000 metres of exploration drilling on Kemess North and several nearby prospects. Twelve holes were drilled at the Nugget porphyry gold-copper prospect, just southwest of the Kemess North deposit. Hole KN-03-12 intersected 419 metres averaging 0.38 g/t Au and 0.13% Cu starting at a depth of just 24 metres. The area of shallow mineralization will be further evaluated for its potential to be a satellite ore body. Two holes were drilled at the Kemess Centre porphyry gold-copper prospect, 3 at the Duncan Ridge silver-copper-zinc skarn and 8 in an area between Duncan Lake and Kemess Lake, referred to as the 'Valley of the Dolls'. Hole DR-03-01 intersected 11.75 metres of garnet-diopside skarn at a down-hole depth of 312 metres that graded 0.8% Cu, 2.24% Zn and 12.7 g/t Ag.

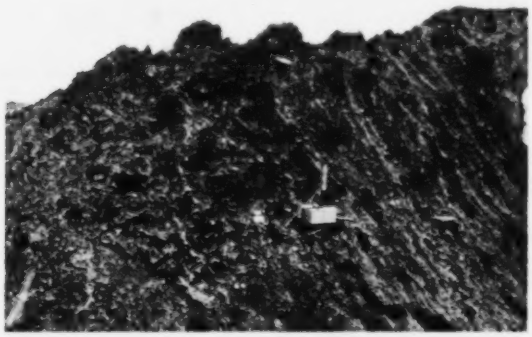


Photo 1. Drill on the Kemess North project.

Northgate also conducted grassroots exploration on its claims. Prospecting late in the field season east-northeast of Kemess North located numerous angular boulders of vein material that are referred to as the Hilda showing. Grab samples from the boulders averaged 5 g/t Au and 44 g/t Ag with anomalous copper, zinc and lead values. The Archie occurrence, located northwest of Duncan Ridge, is a narrow quartz-magnetite vein with visible gold. The company also staked the Bear claim group, which covers a 70 km^2 area immediately south of and adjoining its existing tenure. Data from an airborne geophysical survey completed over the new claims will assist in guiding future exploration.

In addition, Northgate conducted a five-hole drill program on the **Brenda** (094E 147) porphyry gold-copper property located 25 kilometres northwest of the Kemess South mine. The property, on option from Canasil Resources Inc., is underlain by intermediate volcanics of the Late Triassic Takla Group that are cut by Early Jurassic monzonite dykes. Mineralization, which occurs primarily in propylitically altered andesite, is associated with quartz-magnetite veinlets and stockwork zones. Drilling was focused near the White Pass zone. Assays from the 2003 drilling included a 161.6 metre intersection in hole BR-03-07 that averaged 0.565 g/t Au and 0.079% Cu. Northgate renewed its option for the 2004 field season.

On the vast **Pine** property, centered about 20 kilometres north of the Kemess South mine, Stealth Minerals Ltd. embarked on an extensive program of prospecting and sampling. Most previous work on the property focused on its porphyry gold-copper potential (094E 016, 045), but the grassroots program discovered a number of very prospective high and low sulphidation epithermal gold prospects (e.g. BeeGee, Sickle Creek and Mess), several polymetallic skarn occurrences, and additional porphyry gold-copper showings (e.g. 10K and Pine North). One of the 2003 discoveries, the Sickle Creek (094E 237) epithermal vein system, produced some spectacular assay results and may have significant regional implications. Mineralization occurs east of the Toodoggone formation within felsic flows and pyroclastics mapped as 'undivided Hazelton Group', although it is suspected that they may be much older, perhaps the Pennsylvanian-Permian Asitka Group. The north-northwesterly trending zone is characterized by several prominent quartz-carbonate-sulphide veins, such as the 570 vein, breccias and stockworks as well as nearby auriferous siliceous sinter and mudstone deposits. The zone is developed within an alteration envelope consisting of quartz, K-feldspar, sericite and carbonate that locally exceeds more than 100 metres in width, has been traced for more five kilometers northward to the Kevin showing, and is part of a 16-kilometre long mineralized corridor. Grab samples assayed up to 100.2 g/t Au and 1185 g/t Ag, and chip samples across several discrete veins (Photo 2) graded as high as 9.5 g/t Au and 407 g/t Ag over 3 metres.

The company also trenched a number of showings and drilled the Wrich Hill (094E 082) and Electrum/Beaver Pond (094E 125) epithermal gold prospects, and the VIP (094E 047, 048) auriferous skarn system. Trenching in 2002 at Wrich Hill and VIP generated encouraging assays, such as 9.4 g/t Au, 22.75 g/t Ag and 0.72% Cu across 6 metres, but drill results from the 2003 program have not been released to date.

Stealth intends to concentrate much of its 2004 exploration program on the Sickle Creek prospect, but will also explore a number of new claim blocks that it staked during the year.

Further north at the **Shasta** (094E 050) epithermal silver-gold deposit, owner Sable Resources Ltd. drilled a number of short holes to further evaluate possible extensions to the JM and Creek zones. Approximately 1400 tonnes of Shasta vein material was mined and processed by Sable at its nearby Baker mill.

Figure 4. Operating mines, major exploration programs and selected smaller exploration projects carried out in 2003 in the Northeast-Central Region.

TABLE 1. MAJOR EXPLORATION PROJECTS, NORTHEAST–CENTRAL REGION, 2003

Property	Operator	MINFILE	NTS	Commodity	Deposit Type	Work Done
Al	Bishop Resources Ltd	094E 079	94E/06	Au, Ag	High-sulphidation epithermal	10 ddh, 712 m; compilation; deposit modeling
Brenda	Northgate Exploration Ltd	094E 147	94E/07E	Au, Cu	Calcalkalic porphyry	5 ddh, 1485 m
Burnt River	Western Coal Corp	093P 007-008	93P/05W	Coal	Sedimentary	est 11-12 pdh, 1500-2000 m
Cariboo (Most Likely)	Cross Lake Minerals Ltd / Gold Giant Ventures Inc	093A 201	93A/12E	Au, Ag	Epithermal vein	access; grid; geol; geochem; 3D IP; 7 ddh, 1421 m
Cariboo Gold Quartz (Bonanza Ledge)	International Wayside Gold Mines Ltd	093H 019	93H/04E	Au	Replacement	26 ddh, 3037 m; u/g development in support of 10,000 tonne bulk sample
Copperline (Skutsil Knob)	Kit Resources Ltd / Hathor Exploration Ltd	093M 117	93M/15E	Cu	Volcanic redbed	geol; 5 ddh, 444 m
Gibraltar	Taseko Mines Ltd	093B 005-008, 011-013, 051, 061-063	93B/09W	Cu, Mo	Calcalkalic porphyry	194 ddh, 33 746 m
Kemess North	Northgate Exploration Ltd	094E 021	94E/02	Au, Cu	Calcalkalic porphyry	27 ddh, 10 003 m exploration drilling; airborne geophys; infill, geotech & onented core drilling; pre-feasibility & feasibility studies
Lustdust	Alpha Gold Corp	093N 008, 009	93N/11W	Au, Ag, Zn, Cu, Pb	Skarn, manto, vein	geol; soil geochem; trenching; 42 ddh, 7209 m;
Mosquito Creek Gold	Island Mountain Gold Mines Ltd	093H 010	93H/04E	Au	Replacement, mesothermal vein	geochem; trenching; drill access; 13 ddh, 1397 m
Mount Polley (Northeast, Springer & Bell zones)	Imperial Metals Corp	093A 008	93A/12E	Cu, Au	Alkalic porphyry	trenching & 21 ddh, 4324 m on Northeast zone; 4 ddh, 2601 m on Springer; airborne geophys
Myrtle	International Wayside Gold Mines Ltd	093H 025	93H/04E	Au	Mesothermal vein	planned 15 ddh, 3000 m
Perry Creek (Wolverine)	Western Canadian Coal Corp	093P 015 & 025	93P/03W	Coal	Sedimentary	est 10 rdh, 1000 m; spot coring; pre-feasibility studies
Pil North & Pil South	Finlay Minerals Ltd	094E 029, 083, 213 & 216	94E/07	Cu, Au	Calcalkalic porphyry	grid; prosp; geol; geochem; IP; mag; 3 ddh, 675 m; airborne geophys
Pine (VIP, Wrich Hill, Electrum/ Beaver Pond)	Stealth Minerals Ltd	094E 016, 045, 047-048, 082, 237	94E/02E	Au, Ag, Cu	Porphyry, skarn, high & low-sulphidation epithermal vein	prosp; geol; grid; geochem; IP; mag; airborne geophys; trench; 20 ddh, 2931 m;
QR	Cross Lake Minerals Ltd / Gold Giant Ventures Inc	093A 121	93A/12W	Au	Skarn (propylite)	grid; 3D IP; mag; geochem; drill access; 18 ddh, 2893 m; scoping study
3Ts (Tsacha, Tam & Taken)	Southern Rio Resources Ltd	093F 055, 068	93F/02W, 03E	Au, Ag	Epithermal vein	prosp; geochem; seismic; radar; excavator trenching; drill access; 22 ddh, 3272 m
Trend (Roman Mtn.)	NEMI Northern Energy & Mining Inc	093I 030	93I/15W	Coal	Sedimentary	37 rdh, 3500 m; spot coring; trenching; pre-feasibility studies
Westport	Williams Creek Explorations Ltd	093H 027, 034	93H/04E	Au	Mesothermal vein, replacement	drill access; 5 ddh, 1007 m; IP

Finlay Minerals Ltd. explored its **Pil North** (094E 029, 083, 213 & 216) property, centered approximately 35 kilometres north of the Kemess South mine, for bulk tonnage porphyry copper-gold mineralization. The company carried out a surface exploration program consisting of prospecting, mapping, and geochemical sampling, and 18 line-kilometres of Induced Polarization and magnetometer surveys. The property is underlain primarily by phases of the Early Jurassic Black Lake intrusive suite. The work expanded the NW zone. It is characterized by a 200 x 600 metre Induced Polarization chargeability anomaly that is coincident with a strong copper-gold soil geochemical anomaly and pronounced leaching and alteration of the underlying monzonite (Photo 3). The surface program also led to discovery of the NW Extension, a quartz-barite stockwork anomalous in copper and lead, and the WG-Gold zone, a well-developed northwest-trending quartz±barite breccia and stockwork zone within phyllic-altered quartz diorite. The latter is estimated to be more than 100 metres wide and has been traced for more than one kilometre; quartz float assayed up to 16.8 g/t Au. Finlay Minerals also drilled four holes to test a coincident magnetic high, Induced Polarization chargeability and copper-gold geochemical anomaly on its adjoining **Pil South** property. The bore holes encountered badly broken to shattered rock and only one reached its target depth. That one intersected weakly propylitized andesitic flows and tuffs of the Triassic Takla Group that are cut by widely-spaced quartz-magnetite-pyrite±chalcopyrite±sphalerite veins.

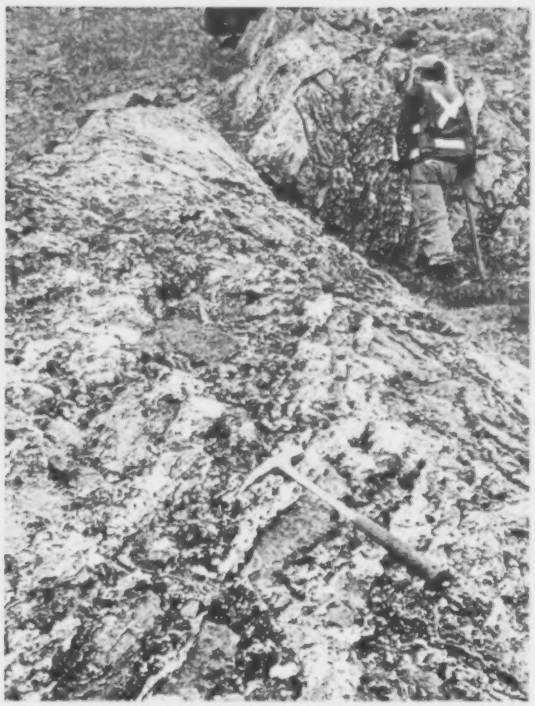


Photo 2. Dave Kuran surveys the 570 quartz-carbonate-sulphide vein, part of the Sickle Creek epithermal gold-silver prospect, Pine property. Photo courtesy of David Blann, Stealth Minerals Ltd.

Photo 3. Larry Diakow, project geologist with BC Ministry of Energy and Mines, discusses the regional geology of the Pil property with Robert Brown, geologist for Finlay Minerals Ltd.

Bishop Resources Ltd. completed a tightly spaced 10-hole diamond drill program on the **Al** (094E 079) property, optioned from Guardsmen Resources Ltd. Drilling took place on the Bonanza zone near the Ghost pit that was excavated by Cheni Resources Ltd. in 1991. This small, high-sulphidation epithermal deposit has yielded some striking native gold specimens in the past, and visible gold was observed in core from three of the ten holes. Gold is associated with base metal sulphides. High-grade intersections from the program included 5.8 m grading 27.85 g/t Au in hole A03-07, and 13.7 m grading 17.45 g/t Au in hole A03-09. The company has raised funds to support future exploration on the property.

Guardsmen also vended the former **Lawyers** (094E 066) epithermal gold-silver mine to Bishop Resources Ltd. This reclaimed underground mine was operated by Cheni Resources Ltd. from 1989 until 1992 and produced more than 171 000 ounces of gold and 3.55 million ounces of silver. In 2003, Guardsmen completed a month-long program of prospecting, geochemical sampling and minor trenching. The program generated encouraging assay results, particularly in an area that may represent a southern extension to the mined AGB zone. A channel sample across the zone averaged 5.13 g/t Au and 20.8 g/t Ag over 27 metres.

Omineca Mountains

Doublestar Resources Ltd. decided to reassess elements of a $20 million production scenario outlined in a 2003 feasibility study on its **Sustut** (094D 063) volcanic redbed copper project located 40 kilometres south of the Kemess South mine. The Southeast zone comprises a diluted mineable resource of 6.3 million tonnes grading 1.64% Cu and 5.42 g/t Ag. Doublestar's formal partnership arrangement with Procon Mining and Tunneling Ltd. and Northgate Exploration Ltd. has been dissolved.

The **Copperline** (Skutsil Knob, 093M 117) volcanic redbed copper prospect, located in the Driftwood Range 120 km northeast of Smithers, was re-evaluated by Kit Resources Ltd. and joint venture partner Hathor Exploration Ltd. The companies drilled three holes to confirm and expand the previously identified Main zone, and two holes to test the West zone, which is 1.2 km to the southwest. Mineralization consists of 5 to 10% fine-grained disseminated and stringer bornite, tetrahedrite, chalcopyrite, chalcocite and rare native copper within subaerial, calc-alkalic volcanics of the Lower Jurassic Telkwa Formation. Drill hole CL-16 intersected two well mineralized zones on the Main zone that are 13 metres apart. The upper interval averaged 0.812% Cu and 25.8 g/t Ag over 14.3 metres and the lower interval averaged 0.385% Cu and 13.3 g/t Ag over 21.0 metres.

Northern Hemisphere Development Corp. conducted an Induced Polarization survey, bedrock mapping and geochemical sampling on its **Kaza** (093M 111) copper-gold-silver skarn property, 30 kilometres due north of Takla Lake. Felsic dykes intrude andesites of the Lower Jurassic Telkwa Formation on the property. The work extended the central mineralized zone along trend to the north-northwest and south-southeast, and identified several sub-parallel magnetite-rich zones that produced encouraging grab sample assays. One sample assayed

2.30% Cu, 5.81 g/t Au and 26.6 g/t Ag. The company also explored the adjoining **Northstar** (Fred, 094D 032) property, where north-trending chalcocite-bornite veins and stockwork zones occur within bladed feldspar porphyry flows, tuffs, and related sediments of the Triassic Takla Group. Chip sampling across these structures produced assays up to 4.69% Cu and 33.2 g/t Ag over 2.3 metres. Drilling is planned for both properties in 2004.

Wildrose Resources Ltd. conducted a bedrock mapping, prospecting and geochemical sampling program on the **Carruthers Pass** (094D 172) volcanogenic massive sulphide property. The property, which is located about 70 km south of the Kemess South mine, is on option from Phelps Dodge of Canada Limited. The program followed up encouraging contour soil geochemical results that Phelps Dodge obtained during earlier exploration efforts. Late in the year Wildrose optioned the claims to MaxTech Ventures Ltd. who plan to carry out a multiparameter airborne geophysical survey in 2004.

Eastfield Resources Ltd. did not explore its **Lorraine** (093N 002, 066, 224) alkalic porphyry copper-gold property in 2003. However, the property, which is located in the Omineca Mountains northwest of Germansen Landing, caught the attention of several mining companies, each of whom toured the property and examined its database. A 2004 drill program is anticipated.

Eastfield Resources vended its **Indata** (093N 092) property, located 40 kilometres southeast of Takla Landing, to Castillian Resources Inc. In the ensuing exploration program two grids were extended and soil sampling and Induced Polarization surveys were completed over the Albert Lake porphyry copper-gold prospect. The geochemical data expanded the copper anomaly, and spot arsenic and antimony highs suggest the presence of precious metal veins similar to those identified on the eastern part of the property.

Minterra Resource Corp. optioned the **Star** magmatic platinum group element property, located 13 km from Aiken Lake in the Lay Range, from Ursala Mowat. The company proceeded with an eight line-km Induced Polarization survey that identified a number of drill targets. Platinum and palladium-bearing disseminated magmatic sulphide mineralization, mainly chalcopyrite and pyrrhotite, occurs within shallow dipping sheets of olivine clinopyroxenite and pyroxenite of the Polaris Ultramafic Complex.

Prospectors Dave Hayward and Gary Lee returned to their **Nina** (093N 011) volcanogenic massive sulphide prospect, north of Germansen Landing. They blasted several trenches in the hope of exposing new showings. No results have been released to date.

Alpha Gold Corp. drilled three styles of mineralization on its **Lustdust** (093N 009) polymetallic prospect, located 210 kilometres north-northwest of Prince George and immediately west of the Pinchi fault. The property is underlain by deformed oceanic rocks of the Cache Creek Terrane that have been intruded and altered by the Eocene Glover monzonite stock and a series of related feldspar megacrystic dikes and sills. Drilling intersected the north- trending No. 1 zone over a strike length of 750 metres. It is a structurally controlled vein and replacement body that includes the former Takla Silver mine. Encouraging gold, silver and base metal mineralization was intersected over widths of 0.5 to 7.4 metres within a 450 metre long section. For example, hole LD03-09 intersected 5.0 metres averaging 13.3 g/t Au, 899 g/t Ag, 1.1% Pb and 5.7% Zn. The No. 3 zone is an intensely oxidized gold-bearing manto deposit (Photo 4). It too has a northerly trend and occurs within grey dolomitized limestone. Wall rock is typically discoloured to a pale brown tones and has been decalcified. Surprisingly, the manto is oxidized to depths of more than 100 metres. The richest gold grades from this zone occurred in hole LD03-30 that averaged 20.5 g/t Au and 194 g/t Ag over 5.2 metres. The Canyon zone, a well-developed proximal skarn prospect, was the focus of recent drilling by Alpha. Work in 2003 confirmed the deeper, high-grade potential of this promising auriferous copper skarn body. Hole LD03-35 intersected 3.7 metres averaging 3.6 g/t Au, 64 g/t Ag and 5.2% Cu. The company also conducted a broad, grid-based soil sampling and bedrock mapping program that covered not only the Dream Creek area north of the Canyon skarn zone but also part of the Pinchi fault system at the former Bralorne Takla mercury mine.

Photo 4. Consulting geologist Jim Oliver examining oxidized manto mineralization at the No. 3 zone, Lustdust property.

Peace River Coal Fields

In 2003, exploration and deposit appraisal continued at the Burnt River, Perry Creek and Trend properties in the Peace River Coal Fields. Each property has near-term

development potential. The more advanced Willow Creek project was inactive, but a number of recent corporate changes may enable the company to reach a production decision. Strengthening coal markets, driven in part by China becoming a net importer of coking coal, coupled with the purchase of BC Rail by CN Rail, may have a positive impact on the economic viability of these deposits.

Pine Valley Mining Corporation (formerly Globaltex Industries Inc.) will purchase Mitsui Matsushima Canada Ltd.'s 1/3 interest in the project to gain 100% ownership of the Willow Creek (093O 008) coal project. The purchase price must be made in a series of scheduled payments that total Cdn$6 million by June, 2005. Completing the deal will enable Pine Valley to regain the exclusive right to market the Pulverized Coal Injection (or PCI) product. Test mining in 2001 and 2002 produced 84 400 tonnes of coal that was shipped to Japan. Tests have shown that the Willow Creek medium volatile bituminous coal can produce a PCI product with qualities that are as good as, or better than, the current benchmark. The Willow Creek coal measures occur within the Cretaceous Gething Formation on the east limb of the Peace River anticline. Current mineable reserves for the property total 12.3 million tonnes. A review of the final feasibility study, completed in September 2002, identified a total capital requirement of approximately Cdn$18 million. Subject to financing, the company plans to initiate production in the first half of 2004 at a rate of 500 000 tonnes per year then ramp up to the permitted level of 900 000 tonnes per year. Estimated mine life of the project is 14 years.

In 2003, Pine Valley hired Norwest Corporation to evaluate the coal reserve potential of its adjacent **Pine Pass** (093O 007) property. Norwest's report indicated that 9.5 million tonnes of coal could be recovered from two pits using low-cost surface mining methods. The coal seams correlate with those at Willow Creek, but more coal quality testing is required to accurately characterize the Pine Pass material. Production at Pine Pass could supplement that of Willow Creek.

Late in 2003, Western Canadian Coal Corp. initiated a 10 to 12-hole rotary and core drilling program on its **Burnt River** (093P 007 & 008) coal property, located 50 kilometres southwest of Chetwynd. In 1981, Teck Corporation identified a resource of 23 million tonnes of low-strip ratio Gething Formation coal on the property. Geological bedrock mapping and exploration drilling completed in 2001 and 2002 by Western confirmed that the coal measures continue along the northwest trend of the Dillon Anticline thereby increasing the potential for additional low strip ratio coal. Western believes that the high carbon and high energy content coals of the main deposit at Burnt River are well-suited to the expanding low-volatile, pulverized coal injection (PCI) market. Western has advanced planning for its Burnt River project based on annual production of 750 000 tonnes over a 10 year mine life.

Western Canadian Coal Corp. filed a revised project description report with the province's Environmental Assessment Office for its Wolverine metallurgical coal project. The cornerstone of the plan is development of the **Perry Creek** (093P 025) deposit that is located between the former Quintette and Bullmoose mines near Tumbler Ridge. The coal measures, which occur within the Lower Cretaceous Gates Formation in a gently southeast plunging open syncline, have a medium-volatile bituminous rank. The new plan, based on a resource of 17.4 million run-of-mine tonnes, features open pit mining for the first 8 years of operation at a rate of 1.6 million tonnes per annum. According to the proposal, open pit development of the nearby **EB** (093P 015) deposit, with a resource of 8.21 million run-of-mine tonnes, would proceed concurrently. Underground development of the remaining resource at Perry Creek would be considered following completion of open pit mining. In 2003, Western continued with its rotary and core drilling program. Coring of the seams produced enough coal to facilitate one coke test. The company plans to return to the property early in 2004 for an expanded coring program to recover enough coal to satisfy a number of requests from potential customers, and to run a pilot scale wash plant test.

NEMI Northern Energy & Mining Inc. (formerly Consolidated Goldbank Ventures Ltd.) completed a major trenching, rotary drilling and coring exploration program, on its **Trend** (093I 030) metallurgical coal property (Photo 5) 25 km southeast of the inactive Quintette mine. The property is divided geographically into the South, Roman, Extension and Hambler areas or blocks. Past exploration outlined an inferred resource of 30 million tonnes on the South block and 27 million tonnes on the Roman block. The southerly continuation of coal seams identified on the South block occur in the Extension and Hambler blocks, and may greatly expand the overall resource of the property. The coal measures are within the Middle Gates Member. Five seams (D, E, F, G/I and J), all greater than one metre thick, occur in a steeply northeast-dipping homocline. These five seams have a cumulative thickness of more than 15 metres on the South block. Drilling on the Extension block in 2003 showed that the cumulative thickness of the five seams reaches 18 metres there, and that seams D and F merge to form a single 12-metre thick seam. Coring of each of the five coal seams produced approximately 150 kg of material that will be evaluated for a range of characteristics, including ash chemistry which has a significant impact on the CSR (Coal Strength after Reaction) value. Analysis of cuttings from rotary drilling will provide data for acid-base accounting and potential acid rock drainage characteristics of the host rock. The company plans to complete a preliminary feasibility study that will update the property's coal resource and form the basis for further work.

Photo 5. View of the Extension block, Trend property. Photo courtesy of NEMI Northern Energy & Mining Inc.

Photo 6. Banded quartz-sulphide mineralization, Ted vein, 3Ts property.

NEMI acquired a total of 16 coal licenses that cover the **Saxon East** (093I 016), **Saxon South** and **Omega** properties and expand the Trend property. Considerable exploration has been conducted in the past on Saxon East and Omega, and resources have been outlined on both properties.

Nechako Plateau

One major drill program and several smaller projects targeted epithermal gold-silver deposits in the Nechako Plateau area. Prospecting and re-evaluation for several other deposit types also took place.

The **3Ts** property of Southern Rio Resources Ltd. hosts a northerly-trending, low-sulphidation epithermal gold-silver quartz vein system. It is on the Nechako Plateau approximately 120 kilometres south of Vanderhoof and includes the Tsacha (093F 055), Tam (093F 068) and Taken claim groups. Exploration identified nine discrete mineralized veins. The veins cut variably welded rhyolite of the Jurassic Naglico formation and are themselves intruded by a Late Cretaceous microdiorite sill. In November 2002, the company released a revised (43-101 compliant) 'inferred resource' estimate for the main Tommy vein of 470 000 tonnes averaging 7.4 g/t Au and 65.22 g/t Ag (using a cut-off grade of 4.0 g/t Au). In 2003, the company conducted two phases of drilling primarily targeting the Ted and Mint veins on the Tam claims. Drilling on approximate 25-metre centers intersected the Ted vein (Photo 6) along a strike length of 350 metres. Mineralized intersections include 10 metres grading 4.65 g/t Au and 552.7 g/t Ag within a 17.05 metre interval that averaged 3.84 g/t Au and 364.6 g/t Ag. The true width of the zone, locally including marginal stockworks and silicified wallrock, reaches 14 metres. The data will be used to establish a resource figure for a portion of the vein.

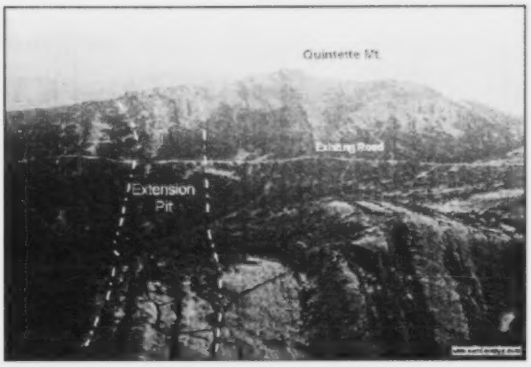
Prospecting of the Taken claims resulted in discovery of a cluster of large, sub-angular quartz vein boulders that comprise the Ringer zone. Sampling of the float yielded a number of impressive assays with values ranging up to 53.7 g/t Au and 332 g/t Ag. Follow-up trenching was unable to reach bedrock, so seismic and ground penetrating radar (GPR) surveys were employed to determine overburden depth. Future work will include trenching and drilling up-ice from the Ringer zone in an attempt to locate the source of the high-grade boulders.

Nustar Resources Inc. evaluated the **Chu** (093F 001) porphyry molybdenum prospect, located about 90 kilometres south-southwest of Vanderhoof. The Chu property covers the contact zone between an Eocene granitic to granodioritic pluton and hornfelsed sedimentary and volcanic rocks of the Jurassic Hazelton Group. Mineralization consists of molybdenite with minor pyrite, pyrrhotite and chalcopyrite as disseminations and coatings along fractures, mainly in biotite-altered argillite. The company sampled and reassayed core from a 1970 Rio Tinto drilling campaign, and also conducted geological mapping, geochemical sampling and geophysical surveys.

Bard Ventures Ltd. completed modest Induced Polarization survey programs on the **Laidman** (093F 067) and **Clisbako** (093C 016) epithermal gold prospects. At Laidman, where stockworks of quartz-pyrite occur in a quartz monzonite of the Cretaceous Capoose Batholith, the survey outlined several high-level geophysical anomalies over the Discovery, 110, and West Trench zones. These merit further exploration. At Clisbako, felsic volcanics of the Eocene Ootsa Lake Group host a well-developed epithermal system. Surveys took place over the Discovery and Brooks grids, where past prospecting located anomalous gold values from both float and bedrock mineralization.

Cariboo

Exploration activity in the Cariboo increased dramatically in 2003. Major projects were conducted at



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Cariboo

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the region's three dormant metal mines, and each produced exciting results that generated renewed optimism for the future of bulk tonnage deposits in the area.

Two helicopter-borne multiparameter (gamma ray spectrometer and magnetometer) geophysical surveys were flown over parts of the central Quesnel Trough in September. The Horsefly survey covered more than 800 square kilometres of ground highly prospective for alkalic porphyry copper-gold mineralization. The adjoining Mount Polley survey covered almost 70 square kilometers of tenure owned by Imperial Metals Corporation. Results from the survey will be released in March 2004. An underground bulk sampling program on the Cariboo Gold Quartz property in the Wells-Barkerville gold belt, stimulated exploration for bonanza-grade gold mineralization, primarily within metasedimentary rocks of the Paleozoic Snowshoe Group.

The **Wishbone** or Northeast (093A 164) zone, discovered by Imperial Metals Corporation is likely British Columbia's most significant mineral discovery in 2003. The zone (Photo 7) occurs on the company's mineral claims that are contiguous with its **Mount Polley** (093A 008) mine lease. It is about 1.5 km from the partly mined Bell pit, and less than three km from the 20 000 tonne per day mill at Imperial's dormant Mount Polley open pit alkalic porphyry copper-gold mine. Trenching and tightly spaced diamond drilling outlined a northwest striking zone with a minimum length of 325 metres, an apparent width of 100 metres, and a down dip extension of more than 200 metres. All but three of the twenty-one holes drilled intersected impressive intervals of well-mineralized hydrothermal breccia.

Hole WB03-01 cut 57 metres with grades of 2.54 % Cu, 1.15 g/t Au and 17.4 g/t Ag, and hole WB03-19, the furthest along trend to the southeast, intersected 119.7 metres grading 1.02% Cu, 0.20 g/t Au and 9.61 g/t Ag. Intensely potassic-altered, 'crackled' to brecciated monzonite and plagioclase porphyry comprise the zone. Chalcopyrite is the main sulphide phase, but bornite is locally abundant—a feature that distinguishes the Wishbone zone from the other known deposits at Mount Polley. Magnetite is uncommon and, unlike the Cariboo and Bell deposits, the Wishbone zone does not have a magnetic geophysical signature. The zone has an apparent average grade of more than 1% Cu, about 0.4 g/t Au, and 7.5 g/t Ag. At present metal prices, the zone would be suitable as a 'starter' pit.

Late season trenching uncovered copper-gold mineralization at several other locations that may extend the Wishbone zone well to the southeast. There may also be potential for additional zones to the southwest. Future exploration will include reevaluation of several nearby zones, such as the Road zone and may include a reinvestigation of the **Lloyd 2** deposit, where Big Valley Resources Inc. outlined a geological resource of 2.93 million tonnes grading 0.53% Cu and 0.40 g/t Au in the mid to late-1990's. Both prospects lie a short distance north of the Wishbone zone.

Photo 7. Pat McAndless, VP of Exploration for Imperial Metals Corporation, and Mike Cathro, Regional Geologist with BC Ministry of Energy & Mines, examine mineralization at the Wishbone (Northeast) zone, Mount Polley property.

In a related program, four holes were drilled to test the potential below the current planned pit on the unmined Springer zone. The first hole, which was vertical, was mineralized over its entire 466.3 metre length. It averaged 0.61% Cu and 0.49 g/t Au for the 267.5 metres it extended beneath the existing pit design depth. The company recently raised C$10 million to support an expanded exploration drill program on the Wishbone area, and to further explore the potential for economic mineralization beneath both the Springer zone and the Bell pit. The Cariboo pit has been mined out. The mine was commissioned in 1997 and was placed on "care-and-maintenance" in September 2001, after producing approximately 60 781 tonnes (134 million pounds) of copper and 11 518 kg (370 300 ounces) of gold. The combined 'remaining probable reserves' at the Springer and Bell zones is 18.7 million tonnes grading 0.397% Cu and 0.385 g/t Au. If column leach testing of high oxide copper mineralization from the upper part of the Springer zone is successful, it may lead to development of a heap leach facility at the mine.

Taseko Mines Ltd. completed the largest diamond drilling program in the region on its **Gibraltar** (093B 005-008, 011-013, 051, 061-063) property, east of McLeese Lake. The property surrounds the inactive Gibraltar mine, which has been on standby status since 1998. Gibraltar has a 35 000 tonne per day mill. The mine opened in 1972 and during its 27 years of operation produced approximately 876 794 tonnes (1933 million pounds) of copper and 9026 tonnes (19.9 million pounds) of molybdenum from four open pits (Gibraltar West, Gibraltar East, Granite Lake and Pollyanna). The property's existing proven and probable reserves as of

December 31, 1998, were 148.7 million tonnes averaging 0.305% Cu and 0.01% Mo. The deposits occur within the Early Triassic Granite Mountain pluton, a zoned subalkalic porphyry copper-molybdenum system. Mineralization is developed mainly in the Mine Phase tonalite within a broad zone of shearing and well-developed sericite and chlorite alteration.

More than 33 500 metres of drilling targeted a series of zones within a pronounced, deposit-sized Induced Polarization geophysical anomaly. The anomaly extends along the eastern and northern perimeters of the area of the main deposits. In some cases, the targets are further defined by significant intersections of copper mineralization encountered in widely spaced holes from previous drilling campaigns. The primary target was the 98 Oxide Zone (Photo 8), centred about 1.1 km east-northeast of the Pollyanna pit. Hole 98-05 intersected two zones of copper mineralization, and enriched copper oxide mineralization, averaging about 0.5% copper, was encountered in the upper part of the hole to a depth of approximately 30 metres.

Photo 8. Drill set-up on 98 Oxide zone, Gibraltar property. Photo courtesy of George Barker, Gibraltar Mines Ltd.

The 98 Oxide zone occurs in propylitically altered and strongly foliated quartz-rich granodiorite or trondjhemite. Oxide minerals are dominated by malachite, azurite, cuprite and tenorite, and chalcopyrite occurs with pyrite and molybdenum in late, cross-cutting quartz veins. The hope is that the zone will contain a copper oxide deposit of sufficient size to support resumption of Gibraltar's 10 million pound per year capacity solvent extraction-electrowinning plant. An Induced Polarization anomaly measuring 1200 metres by 600 metres, located about 1.2 km southeast of the 98 Oxide zone, was also drilled. Other drill targets included the TK Zinc and Highway zones. Late in the year, Taseko announced that it may be able to borrow between $18.5 and $35 million from its reclamation fund to help restart the mine.

At the dormant **QR** gold mine (093A 121), located 58 kilometres southeast of Quesnel, Cross Lake Minerals Ltd. and joint venture partner Gold Giant Ventures Inc. continued to re-evaluate the property's existing reserve and resource base, and also explored several prospective areas of the property. The junior companies are in the process of purchasing the mine site from Kinross Gold Corporation. Mineralization at QR occurs in propylitically altered, epidote-rich basaltic tuffs and fragmental volcanic rocks (Photo 9) of the Late Triassic Nicola Group near an Early Jurassic diorite stock. QR operated from 1995 to 1998 and produced 120 030 ounces of gold, both from open pit mining of the Main and West zones and from underground development of the Midwest zone (Photo 9). The existing on-site resource is estimated to be 900 000 tonnes averaging 3.1 g/t Au. Work completed in 2002 and 2003 is expected to provide additional near surface resources on the Northwest and central West zones. The open pit potential of the Northwest zone was indicated last year by several drill intersections, including hole CL-02-2007 that cut 16.7 metres averaging 4.71 g/t Au.

Photo 9. Aerial view of the Main zone pit and infrastructure at the dormant QR gold mine. Photo courtesy of Ken MacDonald, BC Ministry of Energy and Mines.

A 3D Inversion Induced Polarization survey identified a chargeability anomaly 400 metres east of the mined Main zone. The new target is projected to occur at a depth of about 100 metres below surface at the contact between basalt and overlying siltstone. In December 2003, one diamond drill hole tested this deep target while ten other holes tested both the near surface and down dip potential of the partially mined Midwest zone. The latter holes followed up positive results from drilling that took place earlier in the year, including a shallow intersection that graded 5.1 g/t Au over 15.0 metres. Assay results from the December program had not been released at the time of writing. Drilling is expected to resume in February, 2004.

On the **Cariboo** (093A 201) property, operator Cross Lake Minerals Ltd. drilled an epithermal gold target first identified by Corona Gold Corporation in 1989. Corona diamond drill hole 89-6 intersected 8.5 metres of quartz-

carbonate vein material averaging 5.26 g/t Au. Results from the 2003 Cross Lake drilling program have not been released. The company also examined its **Cantin Creek** epithermal gold prospect. Assays from two drill holes completed in 2003 have not been released.

Skygold Ventures Ltd. and joint-venture partner Wildrose Resources funded extensive soil geochemical sampling and a 23 line-kilometre Induced Polarization survey over a broad area on the **Spanish Mountain** (093A 043) gold prospect near Likely. Several gold anomalies were outlined that have coincident elevated arsenic and molybdenum values. The main anomaly follows a northwesterly trend that lines up with the LE zone. In 2000, Imperial Metals Corporation mined a 1900 tonne test sample from LE that averaged 3.1 g/t Au. Host rocks are the basal black clastics of the Triassic Quesnel Group. Mineralization occurs mainly as stringers and stockworks of pyrite +/- quartz and locally as discrete visible gold-bearing quartz-sulphide veins; some, like the "M" vein, can exceed more than one metre in width. Prospecting discovered a new 0.3 m wide quartz vein 1.3 km south of the LE zone that assayed 156.7 g/t Au. Trenching and drilling are planned to evaluate the established trends in 2004.

Platinum Group Metals Ltd. and Sydney Resource Corporation outlined a 1.5 kilometre long northwest-trending gold, silver and base-metal soil anomaly on the **Simlock Creek** gold property, east of Yanks Peak. The property, which has a history of placer gold mining, is underlain by Downie Succession metasedimentary rocks. Lenses of mineralized limestone and six gold-bearing mesothermal veins occurrences have been identified within the trend; locally these produce bonanza-grade assays, for example, a 160 cm chip sample grading 78.38 g/t Au.

Fjordland Exploration Inc. completed three diamond drill holes on the **Woodjam** (093A 078) gold-enriched alkalic porphyry prospect, near Horsefly. The property is optioned from Wildrose Resources Ltd. who remain the operator. The property is underlain by intermediate flows of the Late Triassic to Early Jurassic Nicola Group that have been intruded, altered and locally mineralized by phases of the Early Jurassic Takomkane batholith. Hole 03-30, collared 810 metres east of the Megabuck prospect near the eastern end of a two kilometer-long chargeability anomaly, intersected 15.4 metres of pyrite-chalcopyrite stockwork with epidote-altered fine-grained andesite that graded 0.90% Cu and 0.04 g/t Au. The intersection is significant in that it may represent an extension of mineralization from the Megabuck prospect where previous drilling encountered intersections as high as 1.39 g/t Au and 0.13% Cu over 58 metres.

Early in the year, Phelps Dodge Corporation of Canada Ltd. completed one drill hole on the **Rim** (Dot Com) property, located just west of Horsefly. The property, which is optioned from Herb Wahl and Jack Brown-John, is underlain by basalt, analcite-bearing amygdaloidal flows, breccias and clastics of the Late Triassic to Early Jurassic Nicola Group. Mineralization consists of disseminations and narrow stringers of native copper, with lesser bornite and chalcocite. Results from the drilling program were not made public.

Otish Mountain Explorations Inc. examined the **Stope Baby** polymetallic vein system, which is exposed in Moffat Creek canyon 5 kilometres south of Horsefly. The company extended existing grids and completed approximately 30 line-kilometres of Induced Polarization and magnetic surveys. The vein system could represent the distal portion of a buried bulk-tonnage porphyry deposit.

East of Likely, Barker Minerals Ltd. conducted modest trenching, geological mapping and geochemical sampling programs on its **Ace** (093A 142), **Frank Creek** (093A 152), **SCR** and **Rollie Creek** volcanogenic massive sulphide (VMS) prospects. The showings occur within metasedimentary rocks of the Harvey's Ridge Succession. A 0.77-metre chip sample across the F-1 massive sulphide lens at the Frank Creek prospect graded 2.1% Cu, 0.34% Zn, 0.11% Pb and 69 g/t Au.

The company also investigated its Black Bear property that includes the former **Providence** (093A 003) underground silver-lead mine. Past production from the mine was about 79 500 grams silver, 62 grams gold, more than 11 000 kilograms lead, and 43 kilograms zinc. Mineralization consists of argentiferous galena with pyrite, minor sphalerite and gold in several gently dipping quartz veins within felsic tuffs of the basal Nicola Group.

At Wells, International Wayside Gold Mines Ltd. commenced development of a 140-metre long decline to access the high grade **Bonanza Ledge** gold zone on its **Cariboo Gold Quartz** property (093H 019). The mineralized zone is up to 30 metres across and occurs within an overturned, northeast dipping sequence of metamorphosed turbidites, carbonates and tuffaceous rocks of the Paleozoic Snowshoe Group. Bonanza Ledge mineralization consists of multiple semi-massive to massive bands that are individually up to 0.75 metres thick of fine to medium-grained pyrite that has preferentially replaced carbonate layers within a thinly laminated, tan-coloured muscovite-rich phyllite.

The portal (Photo 10) was collared in October following completion of a detailed surface drilling program that further characterized the zone. Underground development reached the mineralized zone during the first week of January 2004, and material was stockpiled prior to being shipped to Imperial Metal's Mount Polley mill for processing. The company is permitted to extract a 10 000 tonne bulk sample. The projected head grade of the bulk sample will be about 23 g/t Au. It is expected that the company will complete the bulk sample in the first quarter of 2004. Characterization of different ore and waste rock types will be conducted to provide base-line

data that is required for an expanded underground development program.

Photo 10. Bonanza Ledge portal, Cariboo Gold Quartz property.

The Bonanza Ledge zone has an indicated resource of 337 500 tonnes grading 8.12 g/t Au. The BC vein, a massive quartz±carbonate±pyrite vein on the hanging wall of the Bonanza Ledge zone, has an indicated resource of 296 000 tonnes grading 5.31 g/t Au. Both resource figures, released by International Wayside late in 2002, were calculated using a cut-off grade of 0.7 g/t Au (0.02 ounces/ton).

The nearby Cow Mountain deposit comprises the Sanders, Pinkerton and Rainbow zones that were part of the historic underground Cariboo Gold Quartz mine. This bulk tonnage prospect has an existing indicated open pit resource of about 6 million tonnes averaging 2.23 g/t Au. An extensive underground exploration drilling program designed to expand the zone from the 1200 level down to the 1500 level is planned for next year.About 1.5 kilometres west of Wells, near the former **Mosquito Creek Gold** mine (093H 010), Island Mountain Gold Mines Ltd. completed soil sampling, trenching and diamond drilling in search of high-grade gold mineralization in both replacement lenses and mesothermal veins. Much of the work focused on areas underlain by 'Bonanza Ledge' stratigraphy, which is structurally below the property's 'Mine Trend' strata, where mining of carbonate-hosted replacement mineralization took place at the Island Mountain, Aurum and Mosquito Creek Gold mines. The Island Mountain soil grid was extended westward to cover the Tea Pot vein, a coincident Induced Polarization anomaly and several reconnaissance gold soil anomalies. The results outlined a northwest trending gold anomaly about 350 metres south of the property's long established 'Mine Trend'. Trenching identified narrow, arsenopyrite-bearing replacement lenses at the Fender Bender zone that produced assays of 1 to 3 g/t Au, and exposed silicified limestone with associated quartz veins at the Lightning and Crystal zones. Mineralization at the Crystal zone displays well-developed boxwork texture, evidence that cubic pyrite was once present; panning of C-horizon soil samples produced free gold. Several panel samples of the Crystal zone assayed in excess of 100 g/t Au. Follow-up drilling intersected a quartz-pyrite stockwork zone bordered by silicified wallrock that averaged 27.0 g/t Au over 2.3 metres. An aggressive exploration program is proposed for 2004.

Twelve kilometres to the west, Island Mountain completed a soil grid on its **Dragon** property, which includes the headwaters of Dragon, Montgomery, Timon and Rucheon creeks. These drainages produced mercury-rich gold placers that were derived from an unknown bedrock sources. Mercury can be a pathfinder element for replacement mineralization.

Williams Creek Exploration Ltd. completed a five-hole drill program on its **Westport** (093H 027) property in hopes of intersecting the southeasterly continuation of the high-grade Bonanza Ledge gold replacement zone. The areas tested were several high-chargeability, low-resistivity anomalies identified during an Induced Polarization survey. Drilling encountered several narrow quartz-pyrite veins that produced high-grade gold assays, including a 1.2 metre intersection in hole DDH-03-01 that graded 156.3 g/t Au.

International Wayside Gold Mines Ltd. initiated a 15-hole diamond drill program late in the year on the **Myrtle** (093H 025) claim group, located immediately northeast of the Bonanza Ledge zone. The property, on option from Gold City Industries Ltd., hosts an auriferous quartz-carbonate-pyrite stockwork that returned impressive gold assays from drilling conducted in 2002, such as 17.68 metres grading 9.12 g/t Au in hole M02-01. Several of the proposed drill holes will test the down-dip potential of the new Ethel vein, where grab samples from a 2003 trenching program produced bonanza-grade assays. The drilling program will extend into 2004.

Golden Cariboo Resources Ltd. completed an extensive soil geochemical grid over its **Cariboo Hudson** (093A 071) property, and smaller soil geochemical grids on the Shy Robin Gulch area of its **Grouse Creek** and its **Maude Creek** properties. Each property has potential for both high-grade gold vein and 'Bonanza Ledge' replacement style mineralization. Results will guide further exploration in 2004.

Consolidated Pacific Bay Minerals Ltd. trenched several prospective mesothermal vein occurrences on its **Nugget Mountain** property. The property includes the Skarn (093A 090) prospect, and the B zone, Jewelry Shop and Hibernian (093A 051) occurrences. No results from the work have been released.

METAL MINES

The **Kemess South** (094E 094) open pit gold-copper mine (Photo 11), located in the Toodoggone region about 300 kilometres northwest of Mackenzie, is the only large operating metal mine in the region. Northgate Exploration Ltd. owns and operates the 50 000 tonne per day operation that employs close to 400 workers. The company continues to improve overall efficiency and in 2003 completed several upgrades to its mill that resulted in higher mill availability, higher average daily mill throughput, and increased metal recovery. As well, a new 32 cubic yard P&H cable shovel, commissioned in October 2002, increased production capability in the pit. The company completed construction of a cyclone sand plant that is designed to recover clean sand-sized material from the tailings. The clean sand is used for dam construction and has eliminated the need to transport waste rock from the pit to the dam.

Metal production for calendar year 2003 totaled 9148 kg (294 117 oz) of gold and 34 554 tonnes (76 177 000 lbs) of copper. Since start-up in 1998, Kemess South has produced 42 826 kg (1 376 917 ounces) of gold and 151 625 tonnes (334 272 000 lbs) of copper. Thus more gold has been produced from the Kemess South orebody that from any other porphyry deposit in British Columbia (Island Copper formerly held the record of 35 268 kg of gold) and at this time the mine ranks as the sixth largest gold producer in the province. Mill throughput averaged 51 049 tonnes per day and totaled 18.63 million tonnes for the year, an increase of more than 7.5% over the 2002 figure. Mill head grades averaged 0.702 g/t Au and 0.225% Cu. Proven reserves at Kemess South as of December 31, 2002, stood at 109.4 million tonnes grading 0.712 g/t Au and 0.234% Cu, however reoptimization of the pit design, scheduled for late 2003, may increase the reserves. Existing reserves at the Kemess South deposit will provide mill feed until 2008. However, the life of the overall operation could be extended to 2019 if the advanced exploration-stage Kemess North deposit is put into production (see the Kemess North discussion in the Exploration Summary section).

Photo 11. View of the Kemess South mine looking west.

The Gibraltar, Mount Polley and QR mines, all located in the Cariboo, remained on 'care-and-maintenance' status. Dramatically improved metal prices encouraged a re-evaluation of each dormant operation and prompted efforts to develop alternatives to traditional milling and metal recovery. For example, heap leaching and hydrometallurgical processing, and logistical changes that would result in lower overall mining costs. Major exploration programs that took place on each property during 2003 are summarized in the Exploration Summary and Table 1. Improving economic conditions may lead to one or more of the mines to reopen in the next 12 to 24 months.

COAL MINES

The **Bullmoose** (093P 001) mine, jointly owned by Teck Cominco Limited (61%), BHP-Billiton (29%) and Nissho Iwai (Canada) Ltd. (10%), closed in early April after reserves were exhausted in the South Fork pit. Production in 2003 was limited to 479 000 tonnes of clean coal. Over its 20-year operating life the mine produced and shipped approximately 34 million tonnes of metallurgical coal to Japan. Reclamation of the mine site will continue for two to three years.

While the Bullmoose and Quintette mines are now closed, the supporting critical infrastructure that was developed in the early 1980s, is still intact. This includes the town of Tumbler Ridge, a 129-kilometre rail link to the existing Canadian Northern Railway main line, and the deep sea port facilities at Ridley Island. Metallurgical and PCI coal markets are expected to remain strong for the next few years and increase the likelihood of new mine developments in the Peace River Coal Fields.

INDUSTRIAL MINERAL MINES

Canada Pumice Corporation produced 20 000 cubic metres of screened and sized tephra from its **Nazko** (093B 060) quarry west of Quesnel. The material is used for landscaping, horticultural, filtration and lightweight aggregate applications. The company is continuing to develop new markets, particularly along the west coast of North America. Canada Pumice has also studied options for a significant expansion of its quarry operation to meet increasing demands for its products.

The **Giscome** (093J 025) limestone quarry of Pacific Lime Products Ltd., near the small community of Giscome east of Prince George, produced a limited volume of crushed limestone for use in local pulp mills.

In 2003, approximately 210 000 tonnes of railroad ballast was mined from British Columbia Railway's **Ahbau** basalt quarry, northeast of Quesnel. Canadian Pacific Railway's Giscome basalt quarry, northeast of Prince George, was inactive. The existing inventory of crushed ballast material at the site was sufficient to

address the company's maintenance requirements in the region.

PLACER OPERATIONS

As in the past several years, placer activity in the region during 2003 continued at a low level. However, with the higher price of gold it is anticipated that several large programs will be take place in 2004, and small-scale mining and testing activities will increase. The largest programs are expected to be in the Manson Creek area. As in the past, most small-scale or recreational placer operations will occur along drainages in the Wells-Barkerville, Likely, Hixon and Omineca placer camps.

OUTLOOK FOR 2004

The improved prices of precious metals, base metals and coal will continue to drive grassroots and advanced exploration for both high-grade and bulk tonnage deposits. Higher commodity prices may also enable one or more mines currently on 'care-and-maintenance' status to reopen. Several coal projects in the Peace River Coal Fields will continue to be advanced towards full feasibility and production. The level of placer gold testing and mining will likely increase in the region's traditional placer camps. A number of companies announced financings late in the year and indicate that exploration in the region will increase again in 2004.

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KOOTENAY REGION

By David Terry, PGeo

Regional Geologist, Cranbrook

SUMMARY

Although exploration expenditures in the Kootenay region dropped approximately 6% from the $7.08 million spent in 2002 to $6.7 million during 2003, metal exploration expenditures actually rose to $4.9 million from the $3.7 spent in 2002 (Figure 1). The 2003 total also includes $1.5 million (~22%) spent on drilling for coal at, or in the vicinity of, the five producing coal mines in the Elk Valley, a drop of 48% from 2002; and $0.3 million (4%) spent on industrial mineral exploration (Figure 2). Formation of the Elk Valley Coal Partnership resulted in the significant drop in exploration by the coal companies. In large measure this was balanced out by the resurgence in metal exploration spending in this area of the province.

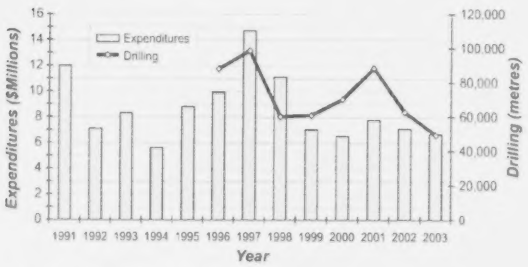

Figure 1. Exploration expenditures and metres of drilling.

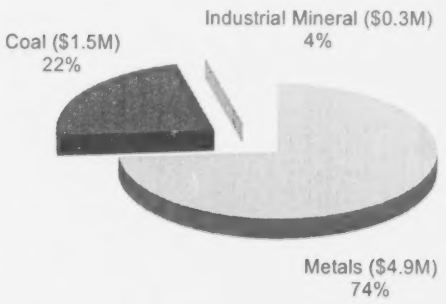

Figure 2. Exploration expenditures by commodity type.

An estimated 49 609 metres of drilling, in all categories, was carried out in the region in 2003, a decrease of 44% from 2002 levels (Figure 1). Coal companies carried out 23 182 metres of reverse circulation drilling, 39% below the amount of drilling carried out in 2002, which itself was well below 2001 levels. Coal drilling comprised 47% of the total metres of drilling, down from 61% in 2002 (Figure 3). Metal exploration drilling continued to rebound in 2003 with 23 150 metres drilled in 197 holes, a 23% increase from 2002 levels. It accounted for 46% of the total 2003 drilling, but only 30% of the total metres drilled in 2002. An estimated 3277 metres of drilling, the remaining 6%, was carried out on industrial minerals projects, down 40% from 2002.

The total number of exploration projects worked on in the region last peaked in 1997 at 231; it has declined since then to approximately 50 in each of the past several years (Figure 4). Higher gold prices enjoyed through 2003 resulted in an ongoing focus on gold-related targets. This is illustrated by Figure 5, which shows the metal exploration expenditures for the region in 2003 broken down by target deposit type.

Gold City Industries Ltd. significantly advanced its Greenwood Gold project in the historical Greenwood mining camp in 2003. The company raised approximately

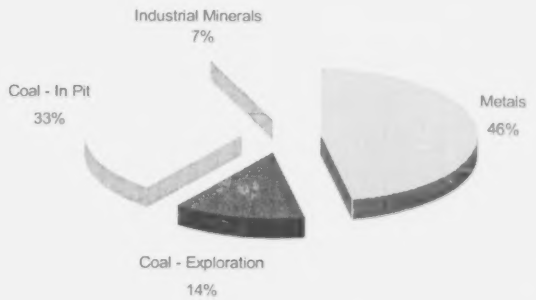

Figure 3. Drilling metres by commodity.

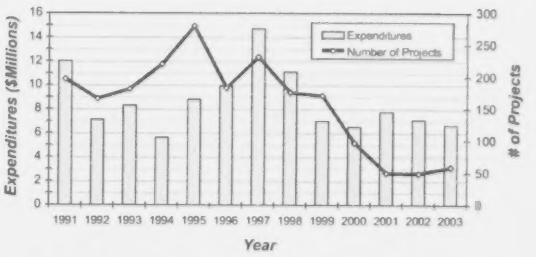

Figure 4. Exploration expenditures and number of projects.

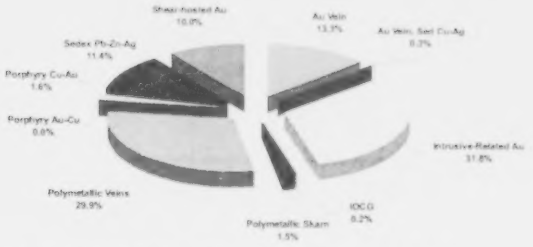

Figure 5. Metal exploration expenditures by target-type.

S4M and carried out successful fall surface drilling programs on both the Lexington and Golden Crown Au-Cu properties, rehabilitated the portal at the Lexington property, and carried out a trenching program on the JD property, which adjoins Golden Crown. Gold City announced that they intend to construct a new 200 tonne per day mill in the Greenwood Camp to process ores from the Lexington and Golden Crown deposits.

Sultan Minerals Inc. continued to explore their Kena intrusion-related gold project near Nelson. Sultan carried out further geophysical survey, geological mapping, trenching and diamond drilling programs. Drilling on the Gold Mountain Zone, located in the northern portion of the Kena property, identified both low grade and high-grade gold mineralization, suggesting potential for both bulk tonnage and smaller bonanza-grade deposits. In 2003 work focused on testing the "magnetic corridor" structure, which was identified through geophysical surveys and tested in 2002 with several drill holes.

Orphan Boy Resources Inc. optioned the Willa Au-Cu-Ag deposit near Silverton in 2002. The company started a multifaceted feasibility study of the viability of mining the deposit underground, then trucking the ore to their Goldstream mill complex north of Revelstoke for processing The results of a digital block model, prepared from the major amount of work carried out by previous operators, were released in the spring. In 2004 the company plans to commence a drilling program to increase reserves at Willa, complete the feasibility study, and achieve a start up mining plan for late 2004.

Metal exploration in the East Kootenay area increased again during 2003. Chapleau Resources Ltd. carried out extensive surface geochemical sampling and prospecting over their large Cranbrook Gold Project claim holdings and conducted important drill programs on their Lookout (Bar 19), Zinger and Jackleg properties. Klondike Gold Corporation continued their campaign of deep drilling to test Sullivan-type Pb-Zn-Ag targets in the Purcell Basin, and also evaluated several gold prospects. Jasper Mining Corporation carried out a surface drill program on their Vowell Creek project west of Golden, testing for extensions to mineralization mined historically at the Ruth Vermont Pb-Zn-Ag mine. To the east, in the Flathead River area, Goldrea Resources Ltd. carried out prospecting and short drill programs on their Howell and Crowsnest intrusion-related Au properties.

Industrial minerals exploration projects declined in the region during 2003. Tiger Ridge Resources continued underground development, bulk sampling, and exploration drilling on their Jubilee Mountain barite project west of Spillimacheen, and carried out a surface drilling program on their Surelock barite property near Radium Hot Springs. Grid Capital Corporation optioned the Rossland Wollastonite property and carried out a short drill program in the fall. As well, Zena Capital Corp. optioned the Lapin barite property near Bridesville and carried out a ground magnetics survey and a short drill program.

The giant Sullivan Pb-Zn-Ag mine closed in December 2001, after more than a century of continuous production. Since then there have been no operating metal mines in the Kootenay Region. Coal production in the Elk Valley for 2003 was approximately 22.5 million tonnes, similar to that in 2002. Early in 2003 all the metallurgical coal mines in the Elk Valley were merged into a single investment vehicle called the Fording Canadian Coal Trust. The trust also includes coal export port facilities in the Vancouver area. The entity, which will control all the coal mines in the Elk Valley, is called the Elk Valley Coal Partnership. All the major industrial mineral mines and quarries operating at the beginning of the year maintained steady production levels throughout the year; no significant change is forecast for 2004. There were no mine closures in the region during the year, and new production came from the Greenwood Slag pile.

EXPLORATION HIGHLIGHTS

Major metals, industrial minerals, and coal exploration projects carried out in the Kootenay Region during 2003 are listed in Table 1. These major projects involved expenditures in excess of $100,000 on exploration drilling, bulk sampling, or underground exploration work. Locations of these projects, and smaller programs that are believed to be regionally important, are shown on Figure 6. There were 13 projects with reported expenditures of more than $100,000 in the Kootenay Region this year.

Metals

In the second half of 2002, Gold City Industries Ltd. completed several major option agreements for properties in the historical Greenwood mining camp. These acquisitions provided the framework for their **Greenwood Gold Project**. The first option deal was for a 100% interest in the **Lexington-Lonestar** property (082ESE041; 082ESE042), which includes two deposits, eleven past producing mines, and a number of mineralized zones with high potential. The

Grenoble/Main Zone has a reported mineral resource of 94 923 tons grading 0.297 oz/ton (10.2 g/t) Au and 1.49% Cu (may not be National Instrument 43-101 compliant) that is accessible by means of a 300 metre decline. The deposit is open down plunge. This mineralization, which is structurally controlled, consists of a complex of pyrite-magnetite-chalcopyrite-gold veins closely associated with a serpentinite-dacite contact. Five other zones are known on the property that have similar characteristics. As well, the Lonestar deposit has disseminated and stockwork Cu-Au mineralization that supported some past production.

Through a second option, Gold City gained control of the **Winnipeg** (082ESE033) - **Golden Crown** (082ESE032) property, 5 kilometres north of Lexington-Lonestar. This property contains a number of Rossland-type veins containing pyrrhotite>pyrite>chalcopyrite in a quartz gangue. The veins are hosted by Paleozoic diorite, greenstone, and serpentinite. Based on a 1990 study a mineral resource of 37 100 tons grading 0.999 oz/ton (31.07 g/t) Au (uncut) or 0.536 oz/ton (16.67 g/t) Au (cut) and 1.12% Cu was calculated (may not be National Instrument 43-101 compliant). The mineralization is accessible by means of a recent 1100 metre adit and also through historical workings, and is exposed in surface trenches. Significant potential exists to expand resources in the area both down-dip and along strike, and parallel veins may exist. The company also has completed option agreements to acquire rights to the adjacent **Zip**, **JD** and **Century Gold** claims.

Gold City closed a £960 000 (~C$2.1 million) loan financing in August 2003. Subsequently the company closed a number of equity private placements that totaled approximately C$1.9 million. On the **Lexington** property Gold City completed 906.6 metres of drilling in 6 HQ holes to attain additional information to refine resource calculations for the Grenoble deposit and for metallurgical testing. Numerous zones of pyrite-chalcopyrite veining were encountered in dacitic host rocks with impressive results, including one 4.57 metre interval that assayed 28.68 g/t Au and 1.17% Cu in hole 03GCD-01. The holes tested the part of the Grenoble deposit that is targeted for bulk sampling in early 2004. In preparation the decline portal was rehabilitated (Photo 1). In addition to the vein-style Au-Cu mineralization present in the Grenoble deposit, an overlying porphyry Cu-Mo-Au vein system was intersected. It averaged 0.2% Cu and 277 ppb Au over the 50% of the interval from surface to 112.7 metres depth in hole 03GCD-01 that was analyzed. The company plans to conduct further sampling to evaluate this style of mineralization.

On the **Golden Crown** property, 5 kilometres to the northeast, Gold City completed 2138.7 metres of drilling in 47 HQ diamond drill holes. Twenty-one of these holes comprised definition drilling of the King Vein with step out holes on approximately 15 metre centres to trace mineralization into previously untested areas. The King

Photo 1. Rehabilitated portal to the Grenoble deposit, Lexington property.

Vein occurs within a steeply dipping and closely spaced Rossland-type massive sulphide vein system; it is a pyrrhotite-pyrite-quartz-chalcopyrite-native gold vein. Drilling returned 19 significant intercepts of the King Vein. One intercept in hole 03CDH-01 assayed 326.82 g/t Au and 0.39% Cu over 1.86 metres. Other noteworthy intercepts include: 1.25 metres assaying 72.14 g/t Au and 1.31% Cu from 03CDH-03; 1.95 metres assaying 11.28 g/t Au and 0.71% Cu from 03CDH-15 and 2.07 metres assaying 10.43 g/t Au and 0.20% Cu from 03CDH-16.

A number of other veins on the Golden Crown property also were tested during the drill program. Four holes were completed on the Samaritan Vein, which is sub-parallel and 60 metres to the south of the King Vein, and hole 03CDH-17 intersected 0.94 metres assaying 21.73 g/t Au and 0.41% Cu. As well, a total of 14 shallow holes were completed on the Tiara Vein, which occurs at a diorite-serpentinite contact 250 metres southeast of the King Vein. The best 1 metre channel sample across the vein where it is exposed in a surface trench assayed 34 g/t Au over 1 metre. The trench exposes the vein along a 70 metre strike length. Core recoveries were poor from most of the Tiara Vein holes, however, several important intercepts were made including: 1 metre assaying 20.20 g/t Au in 03CDH-26 and 1 metre assaying 81.20 g/t Au and 0.24% Cu in 03CDH-28. Several holes also tested the Golden Crown, Portal and Calumet veins.

On the **JD** property, which adjoins the Golden Crown property to the northwest, trenching in 2003 of the Main and Hangingwall areas exposed sulphides in shear zones. The JD mineralization, which is 2.5 kilometres northwest of the Golden Crown mineralization, returned high-grade gold assays. Highlights include: 27.4 g/t Au over 1.8 metres, 12.69 g/t Au over 5 metres, 12.28 g/t Au over 5 metres, and 8.1 g/t Au over 2 metres. The trenched area is centred within a 1000 metre long gold soil anomaly. In the past, trenching tested only 90 metres of strike length within the anomaly. The current trenching program

expanded coverage to 300 metres of strike length. The company is planning an expanded trenching program to test the remainder of the 1000 metre geochemical anomaly. It will also explore the area between the JD and Golden Crown mineralized zones.

Late in the year Gold City announced that they had dropped their option to acquire the Roberts Mill, located 5 kilometres south of Greenwood. Instead, the company plans to construct a new 200 tonne per day mill closer to the mining properties. This new plan will reduce trucking costs, provide more tailings capacity for longer term production, and allow for more design flexibility.

Gold City Industries Ltd. also carried out a trenching and sampling program on their **Midway** gold property (082ESE128) north of Midway. Work focused on sampling and expanding known mineralization in and around the widespread epithermal-textured chalcedonic quartz occurrence at Picture Rock Quarry (082ESE242). Fifteen kilometres northwest of Rock Creek, Jantri Resources Inc. expanded its biogeochemical bark sampling program on the **Caramelia** gold property, which is on option from Gold City Industries. The property encompasses the historic Camp McKinney gold camp, in which the Cariboo-Amelia mine (082ESW020) was the most prolific producer; historic production totaled 124 500 tonnes grading 20.39 g/t Au that yielded 81 600 ounces of Au. The company is directing its exploration focus toward near-surface veins in the till-covered area south of the Cariboo-Amelia vein.

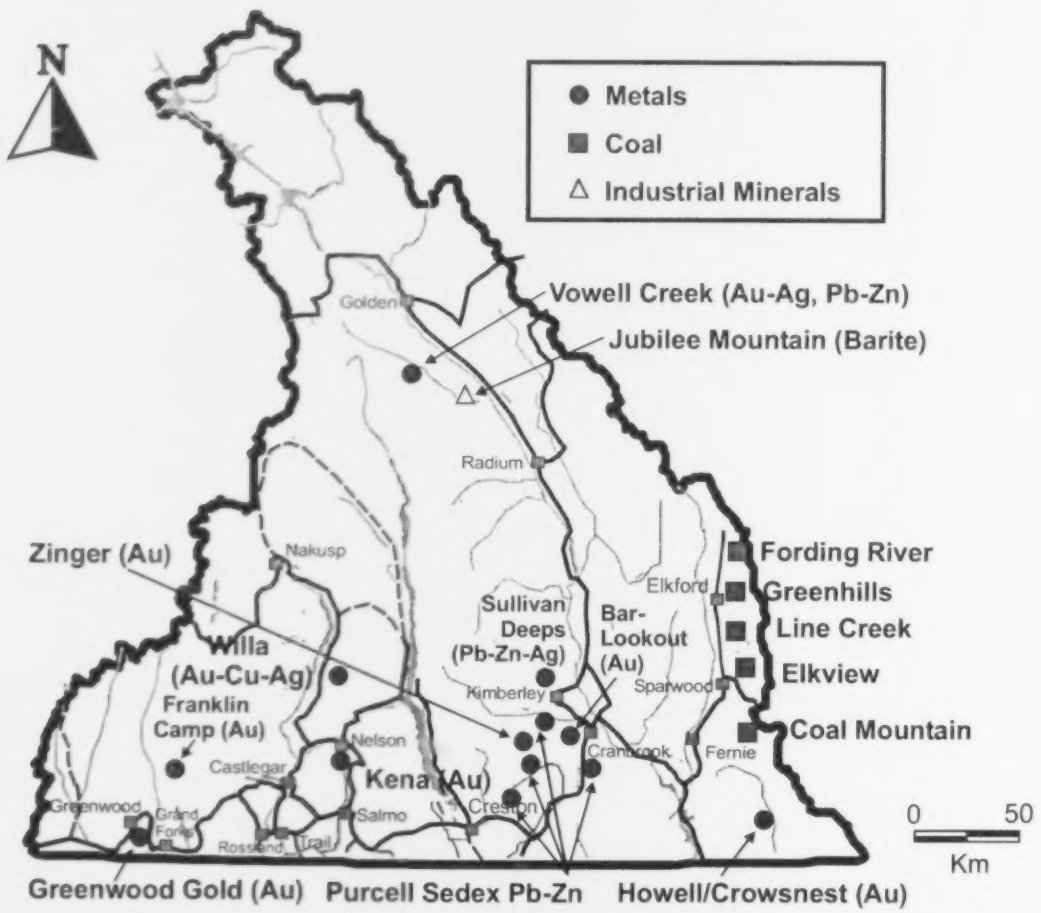

Figure 6. Noteworthy exploration projects in the Kootenay Region, 2003.

TABLE 1. MAJOR EXPLORATION PROJECTS, KOOTENAY REGION, 2003

Property	Operator	MINFILE	NTS	Commodity	Deposit Type	Work Done
Ash/Pit	Corp.	082GNW070	82G/12W	Pb, Zn, Ag	Sedex	1548m dimond drilling in 4 holes
Coal Mountain Mine	al Partnership	082GSE052	82G/07E, 10E	Coal	Sedimentary	7200m RC drilling in 39 holes
Cranbrook Gold Ge...	esources Ltd.		82F, 82G	Au	Intrusive-Related and Structurally Controlled Veins	Regional compilation, soil geochemistry and rock sampling
Fording River Mine	Elk Valley Coal Partnership	082JSE009, 010, 012	82J/02W	Coal	Sedimentary	7699m RC drilling in 84 holes
Franklin Camp	Tuxedo Resources Ltd.	082ENE051, 033, 002	82E/09W	Au	Epithermal/ Mesothermal/Skarn	geochem, trenching, 491m diamond drilling in 9 holes
Golden Crown	Gold City Industries Ltd.	082ESE032, 033	082E/02E	Au, Cu	Sulphide Veins	2500m diamond drilling in 47 holes
Kena	Sultan Minerals Inc.	082FSW237, 331, 332	82F/06W	Au, Ag, Cu	Intrusive-Related	1500m diamond drilling in 22 holes; trenching; geol; gechem; geophys
Lexington	Gold City Industries Ltd.	082ESE041, 042	82E/02E	Au, Cu	Mesothermal Suphide Veins	906m diamond drilling in 6 holes; portal rehab
Line Creek Mine	Elk Valley Coal Partnership	082GNE020, 021, 022	82G/15W, E	Coal	Sedimentary	4400m RC drilling in 33 holes
Lookout (Bar 19)	Chapleau Resources Ltd.	082GSW068	82G/05W	Au	Intrusive-Related	3358m diamond drilling in 17 holes
Vowell Creek	Jasper Mining Corporation	082KNE009, 011, 031, 037,	82K/15W	Au, Ag, Cu, Pb, Zn	Veins, Replacements	2900m diamond drilling in 21 holes
West Moyie Block	Klondike Gold Corp.		82F/08E	Pb, Zn, Ag	Sedex	1535m diamond drilling in 2 holes
Zinger	Chapleau Resources Ltd.	082FSE122	082F/08E	Au	Mesothermal Veins	3317m diamond drilling in 20 holes

During the summer, Saville Resources Inc. optioned the **Bud** property in the Greenwood camp that includes the past-producing **Morrison** mine (082ESE052). From 1901 to 1903, 2647 tonnes of ore was shipped from the Morrison mine; it yielded 19.85 kg Au, 28.32 kg Ag, and 10.7 tonnes Cu. The company completed a work program comprising surface trenching and sampling, and also rehabilitated the Morrison adit to facilitate underground mapping and sampling. Pyrrhotite-pyrite-chalcopyrite mineralization on the property occurs along a skarned tuff contact with limestone. Poddy zones of massive sulphide mineralization returned an average grade of 1.9 g/t Au, 19.5 g/t Ag, and 1.5% Cu over an average width of 1.3 metres. A gossan zone in limestone exposed during trenching averaged 7.8 g/t Au, 9.3 g/t Ag, 2156 ppm Cu, 2691 ppm As, and 4863 ppm Zn over 1.1 metres. High gold values of 14.5 and 14.2 g/t Au came from grab samples of the gossan zone. Eighty metres northeast of this zone, quartz-pyrite-chalcopyrite mineralization in chert assayed 51.6 g/t Au, 403 g/t Ag, and 4.16% Cu in one grab sample.

Kingsman Resources Inc. optioned the **Snowshoe** property, also in the Greenwood Camp, in 2003. The property covers part of the former **Skylark** mine (082ESE011), which has been mined intermittently over the past century, and most recently during the late 1980s. The Serp zone which the 2003 program exposed on surface is one target on the property. The zone straddles the boundary between the Snowshoe and Skylark properties. Past drill testing of this zone along 200 metres of strike length returned high grade values including 0.43 oz/t (13.37 g/t) Au over 13.5 feet from SKR 85-13 and 0.53 oz/t (16.48 g/t) Au over 7.5 feet from SKR 85-22. Two trenches excavated in 2003 exposed the silicified sulphidic mylonite/breccia zone along 50 metres of strike length. Individual assays ranged up to a high of 14 g/t Au and 596 g/t Ag over 1 metre. Trench 03-11 averaged 1.4 g/t Au, 104 g/t Ag, 822 ppm Cu, 0.56% Pb and 0.15% Zn over a true thickness of 6.25 metres; trench 03-12 averaged 1.66 g/t Au, 112 g/t Ag, 1900 ppm Cu, 0.62% Pb, and 0.33% Zn over a true thickness of 3.25 metres. In the Surprise #3 area, 1.5 kilometres southeast of the Serp Zone, trenches exposed polymetallic veins which assayed 3.9 g/t Au, 60 g/t Ag, 2.9% As, 0.26% Cu, 1.8% Pb, and 0.2% Zn over 1.4 metres.

Over the past several years Tuxedo Resources Ltd. put together a large land position in the **Franklin Camp** area 60 kilometres north of Grand Forks. The claims cover the past-producing **Union** (082ENE003) and **Homestake** (082ENE051) mines. The Union mine produced 122 555 tonnes at an average grade of 14 g/t Au and 353 g/t Ag. A program of mapping, soil sampling, and trenching carried out during the summer was followed up in the fall by a 9 hole 491 metre diamond drill program. At the Banner Vein (082ENE002), which has been traced intermittently for 800 metres with widths up to 7.5 metres, seven channel samples across the vein along a strike length of 28 metres of the vein averaged 1.4 g/t Au, 35.3 g/t Ag, 0.3% Cu, 1.36% Pb, and 1.5% Zn over 7.4 metres (Photo 2). The best drill results for the Banner Vein came from hole FR03-5, which assayed 2.35 g/t Au over 4 metres, including a 1 metre sample assaying 5.15 g/t Au. A single drill hole tested the IXL area (082ENE033) where an 80 foot trench averaging 0.78%

Cu with elevated gold was reported from work done in 1969. The hole intersected an 18.4 metre interval assaying 1.86 g/t Au, and a 4.7 metre interval assaying 2.07 g/t Au.

Photo 2. Linda Caron and Tom Schroeter standing on the Banner Vein trench.

During 2003 Columbia Yukon Explorations Inc. optioned the **Gold Canyon** property, 7 kilometres southeast of Burton in the Tillicum Mountain camp. High-grade sulphide mineralization was discovered on the property in 2002 during construction of a new forestry road. The property is underlain by a deformed metasedimentary package within an easterly trending roof pendant that is up to 5 kilometres wide between the monzonite to diorite Goat Canyon stock and the Halifax Creek stock. Numerous dykes cut the metasediments and they are commonly associated with Au-Ag skarn and sulphide replacements. Two subparallel zones of mineralization have been identified on the property to date. A number of 2.0 metre chip samples of galena-sphalerite-pyrite-pyrrhotite±chalcopyrite mineralization were collected; the best assayed 9.98 g/t Au, 562 g/t Ag, 3.6% Pb and 4.6% Zn (Photo 3). A short 6 hole 158 metre drill program was completed to test the discovery area in the late fall. Highlights include: 2.12 metres assaying 37.58 g/t Au and 180.3 g/t Ag, including 1.12 metres assaying 70.0 g/t Au and 236 g/t Ag, from hole 03GC-6; 9.87 metres assaying 3.42 g/t Au and 110.8 g/t Ag, including 1.0 metre assaying 15.0 g/t Au and 522 g/t Ag, from hole 03GC-3; and 2.33 metres assaying 6.77 g/t Au and 9.8 g/t Ag from hole 03GC-1. The company is planning a comprehensive exploration program for the property in 2004.

Northwest of Rossland Kootenay Gold Corp., a private exploration company, discovered a new gold prospect called **Jumping Josephine** during 2003. Quartz stockworks, vein-breccias, ladder and sheeted veins occur within a shear zone approximately 25 metres in width. Individual veins exposed on surface range from 0.5 centimetres to 30 centimetres in width.

Photo 3. Massive sulphide mineralization in trench on Gold Canyon property.

The shear zone, which is accompanied by quartz-clay-sericite alteration, has been traced or projected in outcrop and float along a strike length of two kilometres. Assays from grab samples of quartz veins within the zone ranged from background up to 19 g/t Au; values in the 2 g/t Au range are common. The company also optioned the **Bunker Hill** (082FSW002) property southeast of Fruitvale. The Bunker Hill mine produced 3.2 kilograms of gold and 9.6 kilograms of silver from 340 tonnes of sulphide-bearing quartz vein between 1933 and 1942. The property also contains the Lefevere skarn, which is developed along the margin of the Bunker Hill intrusive stock; assays from grab samples of the skarn ranged up to 14.1 g/t Au. The company also acquired by staking the **Connor Creek** property, 18 kilometres southwest of Nelson, which hosts Rossland type massive pyrrhotite-chalcopyrite-arsenopyrite-sphalerite-galena veins (i.e. 082FSW235; 082FSW356; 082FSW303) and a northerly trending silicified shear zone containing disseminated to semi-massive sulphides. Grab samples collected from the shear zone mineralization range from background up to 7.3 g/t Au. At the end of 2003 all shares of Kootenay Gold Corp. were purchased by First Integrated Enterprises Limited, a publicly listed capital pool company.

Cream Minerals Ltd. carried out a surface rock sampling program on its **Goldsmith** property near Kaslo. The property covers numerous historic workings over a three kilometre trend that is underlain by altered volcanic and sedimentary rocks. Gold mineralization is associated with quartz and quartz sulphide veins ranging from several centimeters to 5 metres in width. Samples were collected from waste dump piles or bedrock veins where possible. Visible gold was observed in five samples, and grab samples assayed up to 9 902 g/t Au. The company plans to carry out further surface exploration work on the property in 2004.

In June 2003, Sultan Minerals Inc. announced that Kinross Gold Corporation was withdrawing from the **Kena** gold project option agreement entered into by the two parties in September, 2002. During the period of the option agreement Kinross spent just under $1 000 000 exploring the property. Sultan continued exploration of the property on their own during the summer. They carried out a detailed structural mapping study, conducted further geophysical surveys, and completed a trenching program (Photo 4). Much of the work focused on a structural corridor that was defined by magnetic response and four drill holes. The corridor was recognized at the end of the 2002 work program. The best results from the trenching program came from the northern part of the "magnetic corridor" (03TR-7) where a 2.0 metre chip sample assayed 66.83 g/t Au. At this location coarse visible gold was observed in limonitic quartz veinlets within Silver King porphyry adjacent to a mafic dyke.

Photo 4. Jack Denny in Kena project trench.

In the Gold Mountain Zone (082FSW379) gold mineralization occurs in areas of the Silver King monzonite to diorite plagioclase porphyry that have undergone silicification and strong potassic alteration, and carry 2 to 5% disseminated and fracture-filling pyrite. Local fine-grained visible gold occurs in drill core. The low-grade mineralized zone locally extends to surface. Some typical assays from 2001 drilling of the zone are 100 metres grading 1.21 g/t Au in hole 01GM-01, 116.05 metres grading 1.87 g/t gold in hole 01GM-03, 130 metres grading 1.14 g/t Au in hole 01GM-05, 160 metres grading 1.15 g/t Au in hole 01GM-08, and 140.38 metres grading 1.10 g/t Au in hole 01GM-28. Several bonanza-grade gold zones internal to the lower-grade areas, for example 172.1 g/t Au over 2 metres in hole 01-GM-08 and 240.1 g/t Au over 1.23 metres in hole 01-GM-03, are spatially related to the porphyry-volcanic contact. Detailed geological and structural mapping carried out in 2003 suggests that gold enrichment within the Gold Mountain zone and its northern extension is linked to a pyrite-K-Feldspar-gold porphyry system developed in the upper part of the Silver King intrusion. In later northwest-trending brittle structures, in which magnetite is reduced and pyrite occurs, gold contents are locally upgraded to form the bonanza-grade structures referred to above.

In the fall Sultan carried out a 22 hole 1500 metre drill program to further test the auriferous structural corridor and to expand and further define the gold mineralization at both the Gold Mountain and the Kena Gold zones (082FSW237) to the south. A total of 8 holes were completed on the Gold Mountain Zone; highlights include 1.15 g/t Au over 58.98 metres in hole 03GM-71, including 1 metre assaying 40.66 g/t Au, and 109.42 metres grading 0.52 g/t Au in hole 03GM-65. Gold mineralization at the Gold Mountain Zone has now been extended by drilling for 1 kilometre to the north and 0.9 kilometres to the south of the initial discovery area. A total of 14 short holes were completed on the Kena Gold Zone; highlights include 52.70 metres assaying 0.88 g/t Au in hole 03KG-05 and 47 metres grading 0.71 g/t Au in hole 03KG-11. The company is carrying out computer modeling of the Gold Mountain and Kena Gold zones and anticipates completion of preliminary resource calculations by early 2004. Sultan also announced that it has fully exercised its option agreement to acquire a 100% interest in the Kena property subject to a 3% NSR on gold and silver, and a 1.5% NSR on other metals. Since the option agreement was initiated in 1999, the company has expended a total of $3 100 000 exploring the property.

In 2002 Cassidy Gold Corp. entered into an option agreement with related company Delta Explorations Inc. on the **Silver Lynx** (082FSW378) VMS Property, 20 kilometres west of Nelson, whereby Delta may earn a 50% to 60% interest in the property. Delta was still going through its listing process late in 2003 but undertook a program of linecutting and IP surveying. The property is underlain by a package of phyllitic felsic tuffs that are overlain by argillites and siltstones of the middle Jurassic Ymir Group. The entire sequence appears to have been folded to form a south-plunging antiform. Mineralization appears to be VMS-type; it is apparently stratabound and within 20 metres of the volcanic-sediment contact. Selected grab samples assayed up to 24.59% Zn, 22.35% Pb, 0.21% Cu, and

556.4 g/t Ag. A four-hole drill program in late 2001 intersected disseminated to semi-massive sulphide zones grading up to 6.87% Zn, 1.13% Pb, and 42.5 g/t Ag over 0.6 metres. The company is planning to drill the property early in 2004.

Orphan Boy Resources Inc. undertook a feasibility study in 2002 to examine the technical and economic viability of underground mining their **Willa** Au-Cu-Ag deposit near Silverton, which they optioned in 2002, and trucking the ore to their **Goldstream** mill complex, which is 75 kilometres north of Revelstoke, for processing. The Willa deposit is hosted by an intrusive breccia pipe (Photo 5) within a large roof pendant of metavolcanic rocks in the Nelson Batholith. The property was explored during the 1980s by joint venture partners Rio Algom Exploration Inc., BP Minerals Ltd. and Northair Mines Limited. During this period 14 300 metres of surface core drilling, 1550 metres of underground development and 15 000 metres of underground drilling were carried out. In March the company released an updated resource calculation for Willa that is based on drilling by the previous operators. The company utilized three cutoff grade scenarios and cut high gold assays to 34.286 g/t Au. Using a 3.5 g/t Au cutoff, measured, indicated and inferred resources total 996 623 tonnes grading 6.3 g/t Au, 0.79% Cu and 10.77 g/t Ag. At a 2.5 g/t Au cutoff, resources in all categories total 1 830 666 tonnes grading 4.77 g/t Au, 0.68% Cu and 9.21 g/t Ag. If a cutoff of 1.5 g/t Au is used, resources in all categories are 3 989 494 tonnes grading 3.23 g/t Au, 0.53% Cu and 7.16 g/t Ag. Aspects of the feasibility study include: evaluation of the Goldstream mill infrastructure and process layout; assessment of the surface infrastructure requirements related to a 500 metric tonne per day underground mining operation at the Willa property; review and update of underground mine plans for Willa; estimation of the cost of trucking Willa ore to the Goldstream mill; and submission of an application for mine development under the Environmental Assessment Act. Orphan Boy intends to commence drilling in early 2004 to increase resources at the Willa deposit, complete the Goldstream/Willa feasibility study, and achieve a startup mining plan for late 2004. The company announced acquisition of the adjacent **LH** gold property early in 2003.

An exciting development for the **Sullivan Camp** came in the spring when private company Mariner Ventures Corporation reached an agreement with Teck Cominco Limited to earn a 50% interest in the **Sullivan Deeps** target, which is north of the historic Sullivan mine, by expending $4 million over four years on exploration. In the fall, this agreement was assigned to Stikine Gold Corporation, controlled by the same principals. The company has been raising funds to initiate exploration and has engaged in public meetings to describe the project.

Photo 5. Intrusive breccia-hosted mineralization, Willa Au-Cu-Ag deposit.

The Sullivan Deeps is an untested exploration target that is about 2450 metres deep and immediately north of the east-trending and north-dipping Kimberley Fault. The site is approximately 4 kilometres northwest of the **Sullivan** mine (082FNE052). The target is geologically and geophysically defined. Cominco drilled a number of deep holes north of Sullivan over the course of three decades of exploration for mineralization related to the northern extension of the Sullivan-Northstar mineralized corridor. The final hole, completed in 1996, cored distinctive formal Sullivan mine stratigraphic units north of the Kimberley Fault but passed through a flat fault 10 metres above where the first ore band was expected to occur. Below the fault the hole terminated in characteristic footwall rocks. A down hole UTEM survey of this hole identified a sheet-like conductor estimated to be 3 kilometres by 3 kilometres in size that lies east of the hole at the prospective Lower-Middle Aldridge (LMC) contact. The conductor has characteristics and footprint similar to that of the Sullivan deposit itself. In early 2004 Stikine Gold plans to start drilling of pilot hole from which a number of wedge holes will be drilled to test the target .

In 2003 Klondike Gold Corp. continued to explore its large holdings in the Purcell basin for Sullivan-type Pb-Zn-Ag deposits. Early in the year a four hole drill program was completed on the **Pit/Ash** property, located 9 kilometres south of the Sullivan mine on the south side of the St. Mary's River. The first three holes were drilled in the same general area. Hole P03-01 cored Lower Aldridge Formation rocks immediately beneath the overburden. Hole P03-2 was collared approximately 4 metres away from Texas Gulf Sulphur hole TGS71-1. The purpose was to confirm a report that the 1971 hole intersected 5.5 metres of laminated and layered semi-massive sulphides at the Sullivan horizon beneath 100 metres of overburden. Immediately below overburden, P03-02 cored approximately 4.5 metres true thickness of laminated to bedded argillaceous wacke with locally abundant sulphide, believed to represent an

incomplete Sullivan section. Within this section 1 metre sample intervals assayed up to 1.2% combined Pb-Zn, the best stratiform sulphide mineralization ever found outside of the immediate Sullivan mine area. P03-3 cored a steep fault, and P03-4, which was drilled approximately 600 metres to the west to a depth of 1073 metres, cored mainly silicified and chloritized Middle Aldridge sediments before passing through a fault and ending in less altered Lower Aldridge Formation rocks. The company is planning further drilling on the property in early 2004.

During the summer Klondike Gold deepened their 2002 drill hole on the **Fran** property, located northeast of Moyie Lake, from 560.2 to 729 metres. Below 610 metres depth, 40 metres of Sullivan-time stratigraphy was intercepted that carried minor disseminated sphalerite and pyrrhotite and contained two intervals with wispy laminations of sphalerite with minor pyrrhotite. Two intervals, 1.1 and 1.3 metres in length, both assayed approximately 0.25% Zn, some of the highest base metal grades recorded from Sullivan-time strata outside of the immediate Sullivan basin and its southward extension into the Pit/Ash claims area discussed previously. In the Aldridge Basin the thickness of the Sullivan Horizon generally varies from 1 to 10 metres but at the Sullivan mine it is approximately 100 metres thick. In the Davent sub-basin. previous drilling indicates that it is as much as 86 metres thick with anomalous base metal sulphide concentrations.

At the northern end of the Payday Basin, Klondike Gold drilled a single hole to approximately 1250 metres depth on the **Payday #1** property. The new hole is approximately 1 kilometre east of a previously drilled hole (SMC95-1), which intersected a Sullivan horizon thickened to 16.8 metres with visible sphalerite and pyrrhotite. The Sullivan time horizon was not apparent in the latest hole and may have been engulfed by a younger gabbro sill; the hole bottomed in Lower Aldridge Formation sediments. To the south, near the headwaters of Lewis Creek in the **Panda Basin** and 30 kilometres southwest of Cranbrook, hole L-80-1, started by Cominco in 1980, was lengthened from a depth of 857 to 1142 metres, and intersected a thickened Sullivan time horizon at the LMC. Klondike Gold also completed a stratigraphic hole targeting Sullivan-type mineralization on their **Spid** claims near the confluence of Spider and Kid creeks, 45 kilometres southwest of Cranbrook. At year end the company was extending a hole on the **Clair** property west of St. Mary's Lake to LMC depth.

Klondike gold advanced their **Thea 17** gold prospect, located along the western edge of the Payday Basin in the Kidd Creek drainage area, with a 13-hole 378 metre diamond drill program and further trenching (Photo 6). The silicified breccia/shear zone has now been traced over a strike length of 600 metres, and has an inferred strike length of at least 850 metres. The prospect was discovered in the late 1990s and exposed in two short trenches in 1999. The shear zone, which strikes northerly and dips variably to the east, cuts Middle Aldridge Formation siltstones and Moyie gabbro sills. It varies in width from approximately 2 metres to more than 11 metres. The quartz-breccia zone is enveloped by limonite stained sericitic siltstone and consists of thin irregular quartz veins and annealed quartz breccias. Grades of chip samples of the zone range up to 14.5 g/t Au across 4 metres in the central portion of the zone; the zone is anomalous in gold over its entire length. Several fences of drill holes tested the central portion of the zone over a 200 metre strike extent. The best results came from the southernmost drill hole (ddh 13) in which the silicified breccia zone assayed 3.7 g/t Au over 3.25 metres, including a 0.65 metre interval of 11.5 g/t Au. The company is planning further drilling for 2004.

Photo 6. Klondike Gold geologists examining trench on Thea 17 gold property.

Sawmill Creek and Perry Creek are both prolific historic placer creeks. Seeking a bedrock source, Klondike Gold Corp. carried out a 273 metre 5 hole drill program on the **Prices Pit** (082FNE056) gold property in the area. In the late 1930s the Prices Pit produced 5194 grams Ag, 3173 grams gold, and 200 kilograms Pb from 381 tonnes of ore. The 2003 program tested a 130 metre section of a north-trending structure with felsic and mafic dykes and irregular lenses of quartz that locally contain high grade gold. Anomalous gold was detected in thin quartz veinlets within and in the footwall margin of a felsite dyke; one intersection of quartz vein material assayed 16.53 g/t Au over 0.49 metres. Further exploration in the area by Klondike Gold will focus on the iron-oxide Au-Cu potential of the area.

Sedex Mining Corp. carried out prospecting, soil sampling, a VLF survey, and a trenching program on high priority areas within its **MW** gold property, located

between Cranbrook and Kimberley. The property is underlain by rocks of the Purcell Supergroup. The claims are at low elevation, consequently a thin veneer of glacio-fluvial sands and gravels covers most of the property. In spite of this, a number of areas with anomalous gold mineralization have been identified through surface sampling of small bedrock exposures. Two areas are considered to be drill targets. One is central to a linear breccia zone that is more than 250 metres wide. Grab samples from a trench that crossed the silicified central zone of the breccia assayed up to 3.62 g/t Au. In a second area, 1300 metres to the north, grab samples from a swarm of quartz veins with associated carbonate alteration assayed up to 2.56 g/t Au.

Ruby Red Resources , a Calgary-based private company, carried out a geologic mapping and trenching program on its **Eddy** gold property in the Weaver Creek area southwest of Cranbrook. The company also conducted soil sampling and geologic mapping on the Loose Leg and Spirit Dream gold properties in the Hughes Range of the Rocky Mountains northeast of Fort Steele.

Late in 2002 Chapleau Resources Ltd. entered into an option agreement to acquire a 70% interest in the **Lookout** (Bar 19) (082GSW068) property, which includes the Lookout gold prospect. The property is 12 kilometres west of Cranbrook. Gold mineralization in the Lookout prospect is related to an altered Cretaceous syenitic dyke that lies along the east-trending Cranbrook fault system. When the prospect was discovered in the early 1990s, soil sampling and a series of trenches traced the mineralization over a strike length of 200 metres. Trench sampling yielded assays as high as 0.132 oz/ton (4.5 g/t) Au across 85 feet (25.9 m); a selected grab sample of quartz stockwork in syenite returned 0.592 oz/ton (20.3 g/t) Au, 3 oz/ton (102.9 g/t) Ag and 1.7% Pb. Chapleau completed 3358 metres of drilling in 17 holes on the property in 2003. Analysis by metallic screen fire assay suggests that a significant proportion of the gold mineralization is coarse, so the 'nugget effect' caused assay results to vary. Highlights of reported assays from the first eight holes include 7.23 g/t Au over 1 metre in hole B-03-03A, and 5.2 g/t Au over 1.06 metres in hole B-03-04A. The property was returned to the vendor before the end of 2003.

Also in 2002, Chapleau Resources Ltd. announced assembly of a major land position in the Cranbrook area through several option agreements and direct claim staking. The major option agreement was with Cranbrook-based Supergroup Holdings Ltd. to acquire a 90% interest in their **Zinger**, **Zeus**, **Hot Sausage**, **Love**, **Jackleg**, **IT**, and **TAC** gold properties. Numerous known gold occurrences occur within the land package, which was laid out to cover two major mineralized trends in the Cretaceous Bayonne magmatic belt. With the exception of the Jackleg, TAC, and IT properties, which are located approximately 35 kilometres northeast of Cranbrook on the eastern side of the Rocky Mountain Trench, the land holdings cover a large area to the west of Cranbrook.

During 2003 Chapleau drilled 3317 metres in 20 holes in the Heart Lake and Gold Run Lakes areas, two separate areas of the Zinger property (Photo 7). In addition the company carried out prospecting and a large soil geochemical survey over the property. Linear mineralized structures on the property cut Middle Proterozoic quartzites and argillites, concordant gabbro sills, and dykes. En echelon mineralized zones of bedding-parallel quartz stockwork with Fe carbonate, sericite, and sulphides occur. Gold mineralization in bedrock has been found over approximately 10 kilometres on the Zinger property. The company identified visible gold in a number of showings, and in pan concentrates of soil and silt. Chapleau reports that several hundred surface rock grab samples contained anomalous gold with values ranging from several hundred parts per billion to several grams per tonne but some samples assayed 15-20 g/t Au. Anomalous gold mineralization over significant widths occurs in a number of holes in the western area of the Zinger property; highlights include: 17.5 metres assaying 0.484 g/t Au, including 1.5 metres assaying 1.41 g/t Au, in hole Z-03-16; and 2.0 metres assaying 1.29 g/t Au, including 0.5 metres assaying 2.24 g/t Au, in hole Z-03-15. This year's drilling tested a 2.8 kilometre extent of the northeast-trending anomalous belt. The company plans to drill-test further targets on the Zinger property in the spring of 2004.

Photo 7. Drilling in the Heart Lake area of the Zinger gold property.

On the Jackleg-Goldylot property, located east of Wasa, Chapleau Resources drilled 3 short holes for a total of 418 metres in two separate areas of the property. Gold showings related to numerous flat-lying quartz veins on the property are hosted by a sequence of alternating quartzites and gabbro sills. Historical gold assays from grab samples range up to 42 g/t Au whereas

those collected by Chapleau this year yielded grades up to 10 g/t Au. Based on analyses of 2000 soil samples collected on the property, a number of strong gold-copper-lead anomalies have been identified. Drill holes that were spotted to test the anomalies intercepted quartz veins and stockworks, but no significant gold values.

Jasper Mining Corporation carried out a surface drill program on their **Vowell Creek** property 30 kilometres southwest of Golden. The property includes the past-producing Ruth Vermont mine (082KNE009), which has a historical indicated mineral resource (drill indicated and probable) of 302 000 tons (273 970 tonnes) of vein and replacement type ore averaging 6.8 oz/t (233 g/t) Ag, 4.8% Pb, and 5.4% Zn (resource may not be compliant with National Instrument 43-101). The property is underlain by folded clastic and carbonate sediments of the Late Proterozoic Horsethief Creek Group, a subdivision of the Windermere Supergroup. The primary purpose of the 21 hole 3200 metre 2003 drill program was to test for extensions to the Ruth Vermont vein system, particularly on the north side of Vermont Creek. On the south side of Vermont Creek, drill holes intersected the Ruth vein system above the underground workings, but the zone was thinner than anticipated by the company. On the north side of the creek, no mineralization was intersected along the strike projection, suggesting it has either pinched out or been offset. During the work the company identified a second phase of gold mineralization. Gold occurs in arsenopyrite veins that are associated with a grit package immediately underlying the mine sequence. Evaluation of the 2003 drill results, in conjunction with information from previous work carried out on the project, is ongoing and will help to direct further exploration on the property.

In 2002 Goldrea Resources Ltd. entered into an agreement to earn a 55% interest in one or both of the **Crowsnest** (082GSE070) and **Howell** (082GSE037) gold properties from Eastfield Resources Ltd.. The properties are in the Flathead drainage basin, 30 to 50 kilometres southeast of Fernie. Both properties cover large gold anomalies related to Cretaceous alkaline rocks that intrude Paleozoic carbonate-dominant sedimentary sequences. In 1999, trench TK99-1 on the Crowsnest property exposed a mineralized zone associated with a syenite dyke that cuts limestone. The zone assayed 8.57 g/t Au over 16 metres. In the general area of trenching numerous altered float boulders of various rock types contain anomalous gold concentrations, some as high as 620 g/t Au. In 2002 Goldrea drilled 660 metres in 11 holes in the area around and south of TK99-1. The third hole of the program (DDH-02-03), which is 200 metres south of TK99-1, intersected 42.5 metres of 0.40 g/t Au, including a 12 metre interval with 1.05 g/t Au and a 3 metre interval grading 2.62 g/t Au. Mineralization is hosted in strongly altered monzonite/syenite and limestone. In 2003 Goldrea carried out a prospecting and sampling program on the property during the summer, then returned in the fall to conduct a 5 hole 477 metre drill program. Four of the holes were completed in the area south of trench TK99-1 and one further to the east to test a geochemical anomaly. Anomalous precious metal values of 0.82 g/t Au and 0.4 g/t Ag over 0.76 metres were reported from hole CR03-1b, located 200 metres south of TK99-1, and 0.06 g/t Au and 248 g/t Ag over 3.05 metres from hole CR03-3, located 150 metres south of TK99-1. Hole CR03-4, 700 metres southeast of TK99-1, intersected 0.02 g/t Au and 240 g/t Ag across 3.35 metres.

Drilling by previous operators on the Howell property intersected 1.23 g/t Au over 58 metres (hole HRC-25) in pyritized and silicified limestone that is intruded by syenite. In 2002 Goldrea completed 3 holes that stepped out to the west about 200 metres from HRC-25. All intersected wide zones of low-grade gold mineralization in silicified and pyritized limestone that is intruded by syenitic dykes, sills, and diatreme breccias. Two hundred metres west of HRC-25, hole DDH-02-01 assayed 0.52 g/t Au over 149.4 metres, including 30 metres grading 0.83 g/t Au. DDH-02-03, 65 metres west of HRC-25, intersected 88.4 metres assaying 0.58 g/t Au, including an interval of 27 metres grading 1.01 g/t Au. In 2003 the company completed two further holes totaling 322 metres in the area west of HRC-25. Both holes cored crudely banded Devonian and Cambrian Fairholme/Elko carbonates with 0.5 to 3.0% disseminated and fracture-filling pyrite. The carbonates are cut by 0.1 to 25.0 metre wide porphyritic syenite and intrusive breccia dykes and sills of the Cretaceous Howell intrusions. Hole H03-01 intersected 87 metres that assayed 0.24 g/t Au and 2.9 g/t Ag, while H03-02 cored 106.4 metres that assayed 0.22 g/t Au and 4.5 g/t Ag.

Commerce Resources Corp. and Lalo Ventures Ltd. drilled one hole on their **Aubyrd 2** claim, which adjoins the Crowsnest property to the south. The hole was designed to test a geophysical anomaly at 200 metres depth, however, drilling was halted at 108 metres due to poor drilling conditions caused by swelling clays. Anomalous values of 32 ppb Au over 1.3 metres in pyritized and brecciated syenite were intersected at the bottom of the hole. The company intends to extend the hole to the target depth in 2004.

Industrial Minerals

Cream Minerals Ltd. located widespread beryl mineralization in pegmatite dykes hosted in both granitic and sedimentary rocks during prospecting and additional claim staking on their **Kootenay Gemstone** property near Salmo. The company reports that ice-blue beryl crystals are most common, followed by green

beryl, and some clear, white and yellow beryl. The property is now more than 50 square kilometres in size and covers 23 kilometres of strike length of the favorable contact area. The company feels the property has strong emerald potential, based on geology and soil and rock geochemistry data from certain areas. In 2004 the company will establish a grid over much of the claim block to facilitate detailed mapping, prospecting and soil sampling to pinpoint areas most prospective for gemstone occurrences.

Tiger Ridge Resources Ltd. continued underground development and surface exploration drilling on its **Jubilee Mountain** (082KNE079) barite project west of Spillimacheen in 2003. The property is underlain by massive dolomite and limestone of the Middle to Upper Cambrian Jubilee Formation. Barite and sulphide mineralization are hosted in veins and solution breccias in the Jubilee Formation. During 2003 the company completed 580 metres of surface drilling in 8 holes and collected a 1000 tonne surface bulk sample. They also completed limited underground development and collected a 1931 tonne bulk sample. As well, Tiger Ridge carried out a 22 hole 1155 metre drill program on the **Surelock** (082KNE081) barite property near Radium Hot Springs. At Surelock, barite cements structurally brecciated dolomites of the Helikian Mount Nelson Formation.

Zena Capital Corp. optioned the **Lapin Barite** project south of Bridesville and completed 217 metres of drilling in 12 holes. The widest intercept was 10 metres of barite but the average was 5 to 6 metres. Further drilling and bulk sampling are planned for 2004.

Grid Capital Corporation completed a 3 hole 124 metre drill program on the **Rossland Wollastonite** (082FSW341) property 9.5 kilometres north of Rossland. The showing is hosted by metasediments of the Pennsylvanian to Permian Mount Roberts Formation that are intruded from the west by syenite and quartz monzonite of the Middle Eocene Coryell Batholith.

Coal

Most coal drilling activity in the region took place within or adjacent to existing open pit mining operations. The Elk Valley Coal Partnership completed 23 182 metres of reverse circulation drilling in 198 holes. Of this, 6669 metres in 27 holes were classified as "deposit appraisal", and 16 483 metres in 171 holes were classified as "mine development" in-pit drilling.

At the **Fording River** mine (082JSE009, 10, 12) the company drilled 6100 metres in 78 in-pit holes, and 1599 metres in 6 exploration holes. At the **Greenhills** mine (082JSE007) in-pit drilling comprised 1383 metres in 12 holes. At the **Line Creek** mine (082GNE020, 021, 022) exploration drilling totaled 2000 metres in 12 holes whereas in-pit drilling consisted of 21 holes with a cumulative length of 2400 metres. At the **Coal Mountain** mine (082GSE052) 4100 metres in 30 holes in-pit and 3100 metres in 9 holes were completed outside the mine area. At the **Elkview** mine (082GNE013), 2500 metres in 30 holes were drilled in producing pits.

In October Cline Mining Corporation announced that it had acquired the coal licenses that cover the **Sage Creek** metallurgical coal deposit in the Flathead Basin area south of Fernie. The Sage Creek deposit was previously held by the Sage Creek Mining Company, a subsidiary of Rio Algom. In the 1980s a large exploration program involving extensive drilling, mapping, trenching, and bulk sampling was carried out on the property. The company also completed a detailed feasibility study and Stage 1 Environmental Assessment Report at that time. In-place coal resources were reported to be 149.9 million tonnes of raw coal, hosted in 3 seams in the North Hill and South Hill deposits. The major shareholder of Cline Mining Corporation is Mitsui Matsushima Co. Ltd. of Japan, an experienced Japanese coal mining and marketing company. Cline plans to carry out a detailed review of past exploration, and to undertake new evaluation and verification studies to determine if the project can be moved toward production.

PRODUCING MINES AND QUARRIES

The locations of producing mines and quarries in the Kootenay Region for 2003 are shown on Figure 7 and listed in Table 2. Production data is included where it is available.

Metals

After more than a century of continuous production, the giant **Sullivan** Pb-Zn-Ag mine at Kimberley closed permanently in December 2001. Since differential flotation to separate lead and zinc concentrates was initiated in 1916, the mine produced more than 17 million tonnes of Zn and Pb metal and more than 285 million ounces of Ag. During 2003, decommissioning and reclamation work at the mine site continued. There are currently no operating metal mines in the Kootenay Region.

Industrial Minerals

All the major industrial mineral producers in the region maintained production during 2003 at roughly the same levels as in 2002.Westroc Inc. expects to produce approximately 475 000 tonnes of gypsum from its **Elkhorn** quarries (082JSW021) near Windermere in 2003. Discovery of the **Elkhorn West** gypsum resource west of the Elkhorn quarry may extend the projected life of that operation beyond the 2005 exhaustion of current

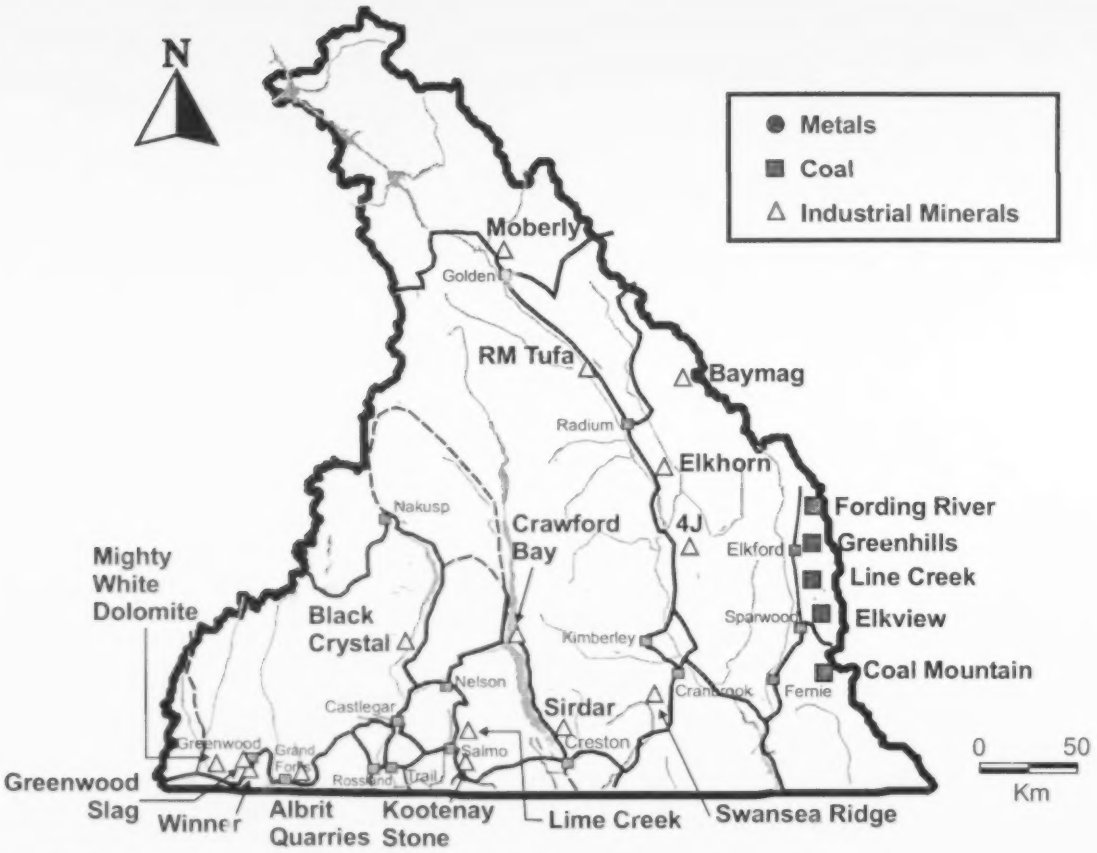

Figure 7. Producing mines and quarries, Kootenay Region, 2003.

reserves. Georgia Pacific Canada Inc. is expected to produce about 175 000 tonnes of gypsum from its **Four J** deposit (082JSW009) near Canal Flats. Typically it ships about 100 000 tonnes of gypsum per year from this quarry to its wallboard plant near Edmonton, Alberta. Both Westroc and Georgia Pacific operate wallboard plants in the Vancouver area.

Baymag Mines Company Ltd. produces high quality magnesite from the **Mount Brussilof** pit (082JNW001) at a rate of approximately 200 000 tonnes annually. The magnesite is transported by truck to Exshaw, Alberta where the company has two plant sites that produce sintered, calcined, and fused magnesia. The Silica Division of Highwood Resources Ltd. expects to ship about 80 000 tonnes of silica from its **Moberly** quarry (082N001), near Golden, mainly to Lavington, British Columbia. In the past it shipped to Springfield, Oregon, and other destinations; however, since the collapse of silicon and ferrosilicon production in the United States, these shipments have stopped.

IMASCO Minerals Inc. processes a variety of specialized industrial mineral products at its plant at Sirdar, north of Creston. Raw materials include dolomite from the underground **Crawford Bay** mine (082FNE113) near Kootenay Lake, and calcium carbonate from the **Lime Creek** quarry (082FSW307) on Lost Creek, south of Salmo. Dolomite is used for soil conditioning, as a white ornamental aggregate, for stucco and roofing, as a fine aggregate, and to produce synthetic marble products. White calcium carbonate is used as a filler in paper, paint and plastics. The company also produces crushed granite and quartzite products from material mined at **Sirdar** (082FSE072) and near Crawford Bay. Dolomite is also quarried and processed by Mighty White Dolomite Ltd. (082ESE200) at **Rock Creek**.

TABLE 2. PRODUCING MINES AND QUARRIES, KOOTENAY REGION, 2003

Mine	Operator	Deposit Type	Forecast Production in 2003
Industrial Minerals			
Elkhorn	Westroc Inc.	Gypsum	500 000 tonnes
Moberly	Highwood Resources Ltd.	Silica sandstone	85 000 tonnes
Mount Brussiloff	Baymag Mines Co. Ltd.	Magnesite	200 000 tonnes
4J	Georgia Pacific	Gypsum	175 000 tonnes
Black Crystal	Crystal Graphite Corporation	Graphite	
Crawford Bay	IMASCO Minerals Inc.	Dolomite	
Kootenay Stone	Kootenay Stone Centre	Flagstone	
Lime Creek	IMASCO Minerals Inc.	Limestone	
Rock Creek	Mighty White Dolomite Ltd.	Dolomite	
Rocky Mountain Slate	Rocky Mountain Slate	Flagstone	
Rocky Mountain Tufa	Alan Wolfenden	Tufa	
Sirdar	IMASCO Minerals Inc.	Crushed granite	
Swansea Ridge	CPR	Railroad Ballast	
Winner	Roxul (West) Inc.	Diorite	
Coal			
Coal Mountain	Elk Valley Coal Partnership	Metallugical coal	2.1 million tonnes
Fording River	Elk Valley Coal Partnership	Metallugical coal	9.0 million tonnes
Greenhills	Elk Valley Coal Partnership	Metallugical coal	4.0 million tonnes
Line Creek	Elk Valley Coal Partnership	Metallugical coal + minor thermal	1.8 million tonnes
Elkview	Elk Valley Coal Partnership	Metallugical coal	5.6 million tonnes

No mining took place in 2003 at the **Winner** diorite quarry (082ESE265), near the past-producing **Phoenix** mine (082ESE020) in the Greenwood mining camp. Instead, plant feed for the insulation and mineral wool manufacturing plant of Roxul (West) Inc. in Grand Forks came from stockpiled material and also from the **North Fork** quarry (20 000 tonnes) north of Grand Forks. In 2004 the company plans to mine 50 000 tonnes from the Winner quarry. Canadian Pacific Railway mined, crushed and shipped railroad ballast from its **Swansea Ridge** gabbro quarry (082GSW065) south of Cranbrook.

Kootenay Stone Centre and other small operators quarry flagstone in the West Kootenays. In 2003, **Rocky Mountain Slate** did not reactivate the new slate quarry that it opened east of Golden in 2002. **Rocky Mountain Tufa** (082KNE059) produced about 2500 tonnes of tufa, mainly for landscaping applications.

Pacific Abrasives & Supply Inc. produces and processes slag from **Grand Forks Slag** (082ESE264) dumps mainly for sandblasting at major shipyards but also for roofing granules. For the last few years some slag has been excavated from the slag pile in **Greenwood** (082ESE266) as a raw material for producing mineral wool by Roxul (West) International Inc. in Grand Forks. In 2003 MRI Americas purchased slag from Greenwood, trucked it to Mission, shipped it on barges to Texada Island then on ships on to Poland, where it will be used to produce lead crystal and abrasives. An initial 25 000 tonnes was extracted and significantly more demand is anticipated (Photo 8).

Photo 8. Greenwood Slag.

Coal

Early in 2003 a multiparty C$ 1.8 billion agreement was reached to combine all the metallurgical coal assets of Fording, Luscar, and TeckCominco (all the Elk Valley mines), as well as the export terminals owned by Luscar and Westshore Terminals at Roberts Banks, to form the Elk Valley Coal Partnership. The partnership is initially 65% owned by the Fording Coal Trust, a TSX listed income trust, and 35% by Teck Cominco Limited, who will act as manager for the partnership. Teck Cominco can increase its ownership to 40% by achieving certain cost savings, and operational and marketing synergies.

Estimated coal production for the Elk Valley mines in 2003 was 22.5 million tonnes. Of this, the **Fording River** mine produced approximately 9.0 million tonnes of metallurgical coal, **Greenhills** 4.0 million tonnes, and **Coal Mountain** 2.1 million tonnes. Thus collective production from these former Fording operations increased to 15.1 million tonnes, up from 13 million tonnes in 2002. **Line Creek** expects to produce 1.8 million tonnes of coking coal and a minor amount of thermal coal, which is significantly less than the 2.6 million tonnes produced in 2002. **Elkview's** 2003 production is estimated to be approximately 5.6 million tonnes of metallurgical coal, similar to that in 2002.

ACKNOWLEDGEMENTS

I thank all the industry geologists and prospectors who have provided me with data and access to their

exploration properties and mines; they made compilation of this paper possible. A great deal of the information relating to industrial minerals in this report came from George Simandl of the Geological Survey Branch, similarly, much of the data on coal was provided by Barry Ryan, now with the Ministry's New Ventures Branch.

SOUTH-CENTRAL REGION

By Michael S. Cathro, PGeo

Regional Geologist, Kamloops

SUMMARY

The 2003 exploration year finished strongly thanks mainly to rising metal prices. By year end, exploration spending had registered a modest increase over 2002, continuing the trend of gradual improvement to the highest levels since 1997. However, levels continue to be well below those seen in the late 1980s.

Weather and fire conditions slowed mineral exploration activity during the summer and early fall of 2003. The dry conditions resulted in bush and road closures, however, activity increased sharply in the fall after the danger had abated. Strong metal prices, in particular for gold and copper, resulted in improved stock market performance and financing opportunities for mining shares. A highlight is that the latter part of 2003 saw more than $40 million in financing raised for exploration projects in south-central BC, suggesting that 2004 will be a much better year.

EXPLORATION TRENDS

The gradual upward trend in exploration activity in the South-Central region continued in 2003. All indicators were at their highest levels in six years. Exploration spending is estimated at $7.5 million (Figure 1), there were about 45 000 metres drilled (Figure 2), and there were 17 major projects in the region (Figure 3; Table 1; Figure 4).

The most popular exploration targets continue to be Cu-Au-Mo porphyries and precious-metal veins, with about 40% and 32% of spending respectively. Lesser amounts were devoted to Au-Cu skarn, magmatic and industrial mineral targets.

Given the strong interest in porphyry deposits, the majority of large projects were located in the highly prospective Quesnel terrane, and most were between Princeton, Kamloops and Ashcroft (Figure 4).

Junior companies continue to carry out most of the exploration in this region. Large producers were responsible for less than 5% of spending, however, this could change as metal prices improve and several projects advance toward production.

Spending was split nearly equally between advanced (development stage) and grassroots exploration projects. Very little was spent on mine-site exploration in 2003. As

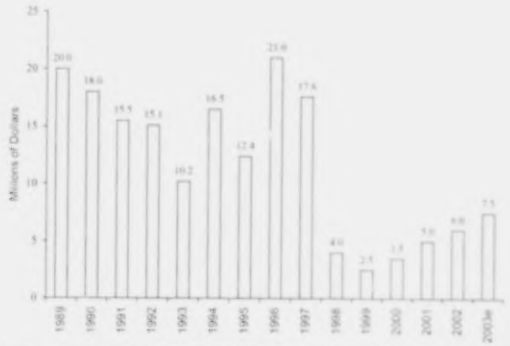

Figure 1. Annual exploration spending, in millions of dollars, South-Central Region.

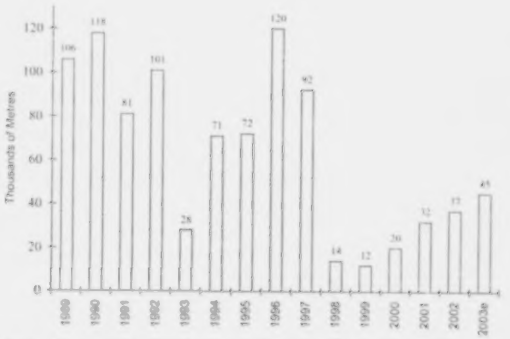

Figure 2. Annual exploration and development drilling, in thousands of metres, South-Central Region.

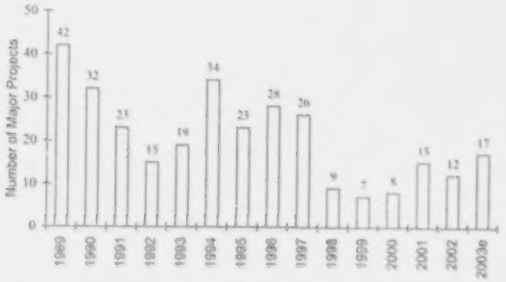

Figure 3. Number of major exploration projects per year, South-Central Region. Major projects are defined as those with trenching or drilling and expenditures exceeding $100 000.

was the case during the last two years, the Afton mine project was by far the largest exploration program. Afton is also expected to be the largest project in 2004; a feasibility study involving a large underground development program is about to get underway (Photo 1).

Photo 1. Portal of Afton Cu-Au-Ag-Pd project, December 2003 (courtesy DRC Resources Corp.).

MINES AND QUARRIES

The region's larger operating mines and quarries are shown on Figure 4. Some of the smaller quarries operate on an intermittent or seasonal basis only.

Canada's largest copper producer, the huge, low-grade **Highland Valley Copper** (HVC; Photo 2) mine is located southwest of Kamloops and employs about 950 people. The mine is owned by a partnership of Teck Cominco Ltd. (63.9%), BHP Billiton Ltd. (33.6%) and Highmont Mining Company (2.5%). Late in the year, BHP Billiton announced it had agreed to sell its interest to private company Quadra Mining Ltd. of Vancouver, subject to a first right of refusal in favour of Teck Cominco Limited. Teck excercised that right in January 2004 and will be the 97.5% owner if the operation. In addition, the HVC partnership signed a new three-year collective agreement with its unionized workforce, retroactive to October 1, 2003.

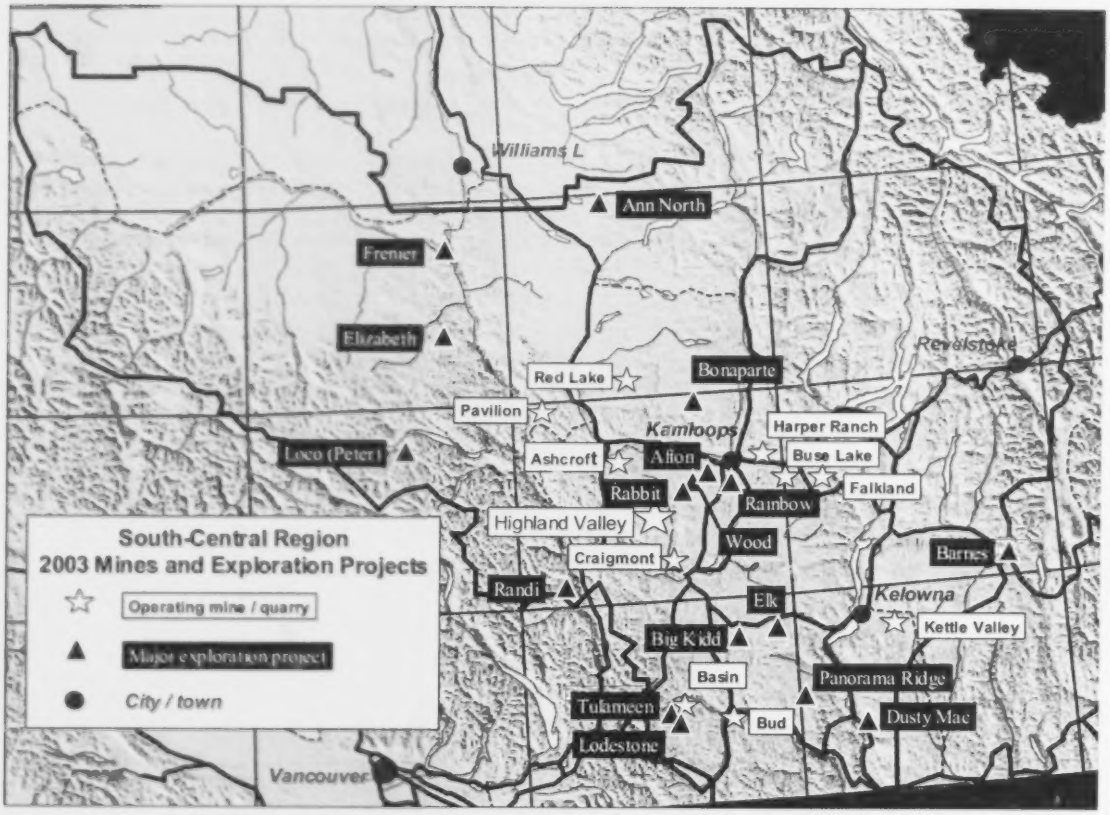

Figure 4. Mines, quarries and major exploration projects, South-Central Region, 2003.

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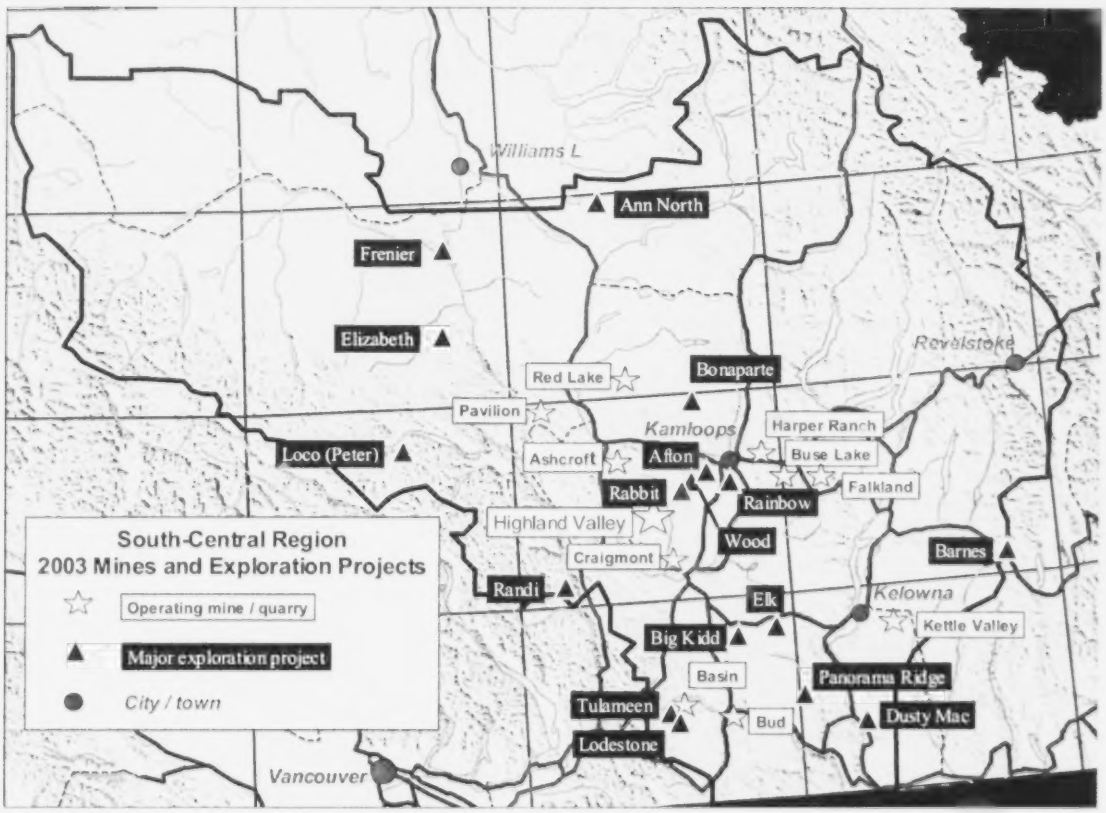

Figure 4. Mines, quarries and major exploration projects, South-Central Region, 2003.

Photo 2. Highland Valley Copper mine.

Photo 3. Basin coal mine, summer 2003.

Production at HVC in 2003 was 170 400 tonnes of copper plus by-product molybdenum, gold and silver. Production is down from 2002 due to slightly lower grades, recoveries and mill throughput. Nevertheless, operating profit was up due to sharply higher metal prices, which were somewhat offset by a stronger Canadian dollar. Although the mine is scheduled to close in mid-2009, a proposal to extend the mine-life by 30 months by deepening the Valley pit is still being considered. Regionally, the company is evaluating several drill targets in the **Pimainus** area south of the mine, and has signed an agreement with Getty Copper Inc. to explore the **North Valley** claims, located northwest of the main mine property (see below).

About 20 000 tonnes of clean thermal coal was mined and sold from the **Basin Coal** project (Photo 3) in 2003. Located near the towns of Coalmont and Tulameen, the operation is a joint venture of Compliance Energy Corp. (65%) and Nissho Iwai Coal Development (Canada) Ltd. (35%). A major milestone in 2003 was the signing of a supply contract with a major cement producer. The joint venture also completed a positive scoping study and is studying the feasibility of establishing a 50 megawatt wood waste / coal-fired power plant near the mine.

The Basin coal, which is high volatile bituminous B and C in rank, is being trucked to a newly constructed wash plant on the Similco site near Princeton, about 45 kilometres away. Clean coal is being marketed to industrial users in the Lower Mainland and southern British Columbia. The project, with measured and indicated resources of 19 million tonnes, has a permit for up to 250 000 tonnes of annual coal production.

Industrial minerals operations continue to be an important part of the regional economy. The Kamloops cement plant and **Harper Ranch** limestone quarry of Lafarge Canada Inc., with an annual capacity of about 220 000 tonnes of cement, operated on an intermittent basis during the year. Lafarge also draws materials from the **Falkland** and **Buse Lake** quarries, which produce gypsum and alumina-silica rock respectively. Pacific Bentonite Ltd. mined a bulk sample of about 3000 tonnes of alumina-rich shale from the **Hat Creek** quarry. This material was tested for use in cement making at the Kamloops plant with favourable results. As much as 10 000 tonnes could be mined in 2004, and there may also be potential to supply material to other Lafarge plants in the future.

At **Pavilion** north of Cache Creek, Graymont Western Canada Inc. (formerly Continental Lime Ltd.) operates a limestone quarry and lime kiln. The plant has recently operated at slightly more than half its rated capacity of 180 000 tonnes per year. Most of the product is used in pulp mills and mines, and the operation employs about 37 people. Graymont is currently studying the feasibility of a change in the surface mining system that would incorporate a raise and glory hole.

IG Machine and Fiber Ltd., a subsidiary of IKO Industries Ltd., operates the **Ashcroft** basalt quarry and roofing granule plant. The plant produces about 250 000 tonnes of roofing granules in six distinct colours. The granules are shipped by rail and truck to IKO asphalt shingle plants in Calgary, Alberta; Sumas, Washington; and elsewhere in North America. About 75 people are employed.

Further along the Thompson River to the northeast, the **McAbee** and **Walhachin** quarries supply railroad ballast for the Canadian National and Canadian Pacific railways respectively. The railroads also have several other quarries in the region.

Craigmont Mines owns the **Craigmont** magnetite tailings operation, located near Merritt. Tailings from the old Craigmont copper mine are processed to recover up to 70 000 tonnes of magnetite annually, however, only about 45 000 tonnes were recovered in 2003. The plant is operated 6 to 8 months per year but product is trucked from the property for 12 months of the year. The magnetite is used in coal washing plants in British Columbia, Alberta and Washington State. The company is evaluating other magnetite sources, both on and off the property, as well as potential markets for hematite, which may also be recoverable.

TABLE 1. MAJOR EXPLORATION PROJECTS, SOUTH-CENTRAL REGION, 2003.

Property	Operator	MINFILE	NTS	Commodity	Deposit Type	Work Done
Afton	DRC Resources Corp	092INE023	92I/10E	Cu, Au, Pd, Ag	Alkalic porphyry	~ 27 ddh, 15 000 m; scoping study; IP; road work
Ann North	GWR Resources Inc	092P 115	92P/14W	Cu, Au	Alkalic porphyry	~ 16 ddh, 2600 m
Barnes Creek	Columbia Yukon Explorations Inc	none	82L/01W	Au	Mesothermal vein	5 trenches, approx. 750 m; geochem, 1527 soils
Big Kidd	Christopher James Gold Corp	092HNE074	92H/15E	Cu, Au	Alkalic porphyry	9 ddh, 1577 m; 3 trenches, 144 m
Bonaparte	North American Gem Inc	092P 050	92P/01W	Au, Ag	Mesothermal vein	15 ddh, 652 m; trenching and stripping
Dusty Mac	Ecstall Mining Corp	082ESW078	82E/05E	Au, Ag	Epithermal vein	5 ddh, 1213 m
Elizabeth	J-Pacific Gold Inc	092O 012	92O/02E	Au, Ag	Mesothermal vein	trenching; road; geochem; geol
Elk (Siwash North)	Almaden Minerals Ltd	092HNE096	92H/16W	Au, Ag	Mesothermal vein	30 ddh, 6569 m
Frenier	BBF Resources Inc	092O 072	92O/08W	Perlite	Industrial mineral	180 tonne bulk sample; processing & market testing
Loco (Peter Vein) [Bralorne]	Bralorne-Pioneer Gold Mines Ltd	92JNE164	92J/15W	Au, Ag	Mesothermal vein	16 ddh, ~1500 m; trenching; underground development and rehab; mill and tailings pond construction
Lodestone Mountain	Sargold Resource Corp.	92HSE034	92H/07E	Fe, V, Pt, Ti	Magmatic	Drilling
Panorama Ridge	Goldcliff Resource Corp	082ESW052	82E/05W	Au	Skarn	17 ddh, 1920 m; trenching; geol; IP geophys; geochem
Rabbit North	Auterra Ventures Inc	092INE045, 147, 130, 114, 071	92I	Cu, Au	Alkalic porphyry, vein	trenching; drilling
Rainbow (Afton Area)	Abacus Mining and Exploration Corp	092INE028	92I/09W	Cu, Au, Ag, Pd	Alkalic porphyry	4 ddh, 1865 m, 3-D IP and mag survey, 61 km
Randi	Locke B. Goldsmith	092ISW054	92I/04E	Au, Ag, Cu	Mesothermal vein	31 ddh, 2083 m; 3 trenches
Tulameen (DP Zone)	Bright Star Ventures Ltd/Cusac Gold Mines Ltd	092HSE120, 142, 035, 039	92H/07W	Cu, Pt, Pd, Au	Magmatic?	4 ddh, ~600 m; geochem, 1986 soils; prosp; trenching; channel sampling
Wood, Beaton	Green Valley Mine Inc / Lakewood Mining Co Ltd	092INE165	92I/10E	Cu	Alkalic porphyry	8 ddh, 3103 m; IP; geochem

At its plant in Kamloops, Western Industrial Clay Products Ltd. manufactures cat litter, barn deodorizer, industrial absorbents, garden mineral supplements and potting soils. The products are mainly prepared from diatomaceous earth mined from the **Red Lake** quarry northwest of Kamloops, and bentonite mined from the **Bud** quarry at Princeton. Garden supplies are developed from "leonardite" mined at Red Lake. Leonardite is a low-grade coaly material that is rich in humic acid. The company also mined a 10 000 t bulk sample of bentonite from the **Bud V** claim, and a 10 000 t bulk sample from the **Bee 1&2** property, both located near Princeton.

The **Z1** (Ranchlands) zeolite quarry near Cache Creek is a small-scale intermittent producer owned by the Mineral Products Division of Dynatec Corporation. The ore is shipped to a plant in Lethbridge, Alberta for processing. The zeolite is used mainly for agricultural purposes.

The nearby **Z2** quarry and a processing plant in Ashcroft are owned by Industrial Mineral Processors, a private company based in Calgary. The plant produces industrial absorbents for oil field clean-up, soil conditioner, barn deodorizers, feed binders, and cat litter.

At Princeton, Zeo-Tech Enviro Corp. owns the **Zeo** (Bromley Vale) zeolite quarry, where a 4000 tonne bulk sample was blasted in 2002. The deposit is reported to have a measured resource of 350 218 tonnes, an indicated resource of 214 310 tonnes, and an inferred resource of 297 000 tonnes.

In April 2003, Zeo-Tech and partner C2C Zeolite Corp. formed an operating company, United Zeolite Products Ltd., which in turn signed a five-year supply contract with Hallibuton Energy Services Inc. for 30 000 tonnes of zeolite. The material will be used to produce lightweight cement for oil and gas wells. At the end of 2003 about 2840 tonnes had been delivered to Hallibuton, at a price reported to be $25/tonne (F.O.B. Princeton). United has begun engineering studies and design work for constructing a zeolite micronizing plant at Princeton. In addition, Zeo-Tech is working to develop further markets in the shotcrete, aquaculture, horticulture and agriculture fields. Also near Princeton, Canmark International Resources Inc. is continuing to develop markets for zeolite from its **Sun** quarry.

Okanagan Opal Inc. produces attractive fire opal gemstones and jewelry from the **Klinker** property, located west of Vernon. Opal occurs as fracture and vesicle-fillings in andesitic to basaltic laharic breccia of the basal Kamloops Group (Eocene). Presently the gemstone jewelry is aimed mainly at the BC tourist-retail market, however, the company aims to develop other North American markets.

Decorative rock and dimension stone are produced at numerous small quarries throughout the region. The best known producer is the **Kettle Valley Stone Company** of Kelowna which sells flagstone, ashlar, facing stone and landscape rock mined from the **Nipple Mountain**, **Canyon** and **Gemini** quarries. Rock types include dacite ash, granite gneiss and basalt.

South of Revelstoke, D.G. Olsson produces small amounts of micaceous quartzite flagstone and facing stone by hand at the **Begbie** quarry. Other small, hand-operated flagstone quarries exploit micaceous quartzite in the North Thompson area.

Landscaping rock is produced at numerous sites, including the **Wing** pit near Princeton (red shale), the **Bailey**, **Leger 2** and **Josh 1** pits south of Vernon (granite), the **Broken Rock Ranch** quarry near Westwold (red lava), the **Pacific Silica** quarry at Oliver (white quartz and pegmatite), and the **Soapy Shale pit** near Armstrong (rusty gneiss). Other prospects being evaluated for small-scale quarrying include the **Barbecue-Landscape** claims near Clinton (red, green and black lava), and the **View** and **Wol** claims near Westwold (lava).

BBF Resources Inc. extracted a 180 tonne bulk sample from the past producing **Frenier** perlite quarry located near Blackdome Mountain, west of Clinton. The material was trucked to Abbotsford for pilot plant testing. Samples will be sent to possible users in the horticulture and building materials fields. A resource of 375 000 tonnes is reported from previous drilling.

Several other moderate to large-sized metal mines and developed prospects remain on care and maintenance status, awaiting higher metal prices or discovery of additional ore. In 2002, Imperial Metals Corp. sold the **Similco** porphyry copper-gold mine, which has been closed since 1996, to Envirogreen Technologies Ltd. Envirogreen is involved in the remediation of special wastes, including hydrocarbons, and has set up a plant on the mine site. Imperial still owns some of the real estate holdings and mining equipment. Similco has a resource of 142 million tonnes grading 0.397% Cu (plus Au) in the area of Pits 2 and 3 on the Copper Mountain side of the property.

The dormant **Blackdome** gold-silver mine, located northwest of Clinton, also remained on care and maintenance throughout the year. J-Pacific Gold Inc. consolidated mine ownership by purchasing the 50% held by Jipangu Inc. This underground mine, developed on narrow, high-grade epithermal quartz veins, operated in the 1980's and again briefly from October 1998 to May 1999. The 200 tonne-per-day mill is intact and the property has an inferred mineral resource of 124 120 tonnes grading 12.8 g/t Au and 33.7 g/t Ag. In 2003 J-Pacific conducted surface surveys on the **Blackdome South** property and discovered evidence of buried mineralization.

Orphan Boy Resources Inc. owns the **Goldstream** copper-zinc mine-mill complex north of Revelstoke. In 2003 the company studied the feasibility of using the 1000 tonne per day Goldstream mill to process copper-gold ore from the **Willa** property, located 230 kilometres south near the town of Silverton. Orphan Boy also has several other good base-metal prospects in the Big Bend area, including the stratiform **Rift** Zn-Pb-Cu deposit, and the **Spire** Cu-Zn massive sulphide occurrence, which is located seven kilometres southwest of the Goldstream mill.

DEVELOPMENT PROJECTS

The largest exploration and development project in the region is the **Afton** alkalic porphyry copper-gold-palladium-silver project of DRC Resources Corp., located just outside Kamloops. The company continued drilling beneath and adjacent to the Afton pit, which a subsidiary of Teck Cominco Ltd. mined between 1977 and 1987. Later production came from the Pothook, Crescent and Ajax pits. Teck closed the operation in 1997.

DRC mainly drilled deep infill holes in the Afton main zone, which extends southwesterly from the bottom of the pit. The zone is now known to measure 800 m in length, 90 m in average width and to extend at least 300 m below the bottom of the open pit. The drilling results were incorporated into a December 2003 mineral resource calculation that concluded that measured and indicated resources total 68 700 000 tonnes at a 0.70% copper equivalent cutoff. The measured resource is reported as 9 540 000 tonnes grading 1.289 % Cu, 0.945 g/t Au, 3.438 g/t Ag and 0.117 g/t Pd, and the indicated resource

is 59 160 000 tonnes grading 1.049% Cu, 0.829 g/t Au, 2.487 g/t Ag and 0.119 g/t Pd. Total contained product in these categories is about 744 000 tonnes of copper (1.64 billion pounds) and 58 tonnes of gold (1.9 million ounces). An additional inferred resource is reported to be 7 450 000 tonnes grading 0.924% Cu, 0.784 g/t Au, 2.341 g/t Ag and 0.12 g/t Pd.

DRC also completed an advanced scoping study toward the potential development of an underground panel (block) caving operation at 9000 tonnes per day, with a mine life of 17 years. The company intends to complete a full feasibility on the project, and raised about $24 million in November to continue this work. In December, an exploration decline was collared at an elevation of about 500 m in the pit, just above the current water level (Photo 1). The decline will provide underground access for a 25 000 m definition drilling program, as well as bulk sampling and engineering studies related to the feasibility study.

On the exploration front, DRC also drilled several holes southwest of the **Pothook** pit. In this area gold mineralization extends for a strike length of at least 200 m with a width of 100 m. Several of the holes had long intersections with anomalous gold values. The best hole was PO-04, which cut 156 m grading 0.72 g/t Au; mineralization begins 6 m below surface. Hole PO-02 was drilled beneath the Pothook pit and cut a 217 m intersection, from 344 to 561 m, grading 0.484 g/t Au and 0.266 % Cu.

It appears that DRC's Pothook gold mineralization may be the same zone, or an extension of the "**Coquihalla West**" gold zone, that Teck tested with 14 holes in 1996, but never described in public reports. At that time, this author (Cathro, 1997) reported that Teck had discovered gold-bearing but copper-poor mineralization adjacent to the Pothook pit. Core from several holes was viewed with Graeme Evans of Teck in March of 1996. Several of the holes had long intersections of anomalous gold associated with chlorite and disseminated pyrite (locally up to 25%), High-grade sections were also verbally reported. For example, a section in hole CO-96-6 assayed 7.2 g/t Au over 12 m, and an interval in hole CO-96-7 assayed 35 g/t Au and 0.12% Cu over 6 m. The better grade section was hosted by chlorite and serpentine-altered Nicola volcanics with trace sulphides. This type of gold-rich mineralization is unusual and could be similar to the QR deposit near Quesnel. It may represent a new bulk tonnage gold target in the Iron Mask district and elsewhere in the Quesnel terrane.

Development work resumed at the **Bralorne** mine site in the Gold Bridge mining district west of Lillooet. The Bralorne mines operated from 1897 to 1971, and the district remains the most prolific historic gold district in the province, with over 4.1 million ounces produced. A Mine Development Certificate was issued for a new mine in 1995, however, since then low gold prices have delayed development. Resource calculations reported at that time gave 406 584 tonnes at a grade of 10.6 g/t Au above the 800 level in the Bralorne mine, and 26 115 tonnes grading 9.6 g/t Au for the Peter vein on the Loco property. Gold mineralization occurs in mesothermal quartz veins.

During 2003, Bralorne-Pioneer Gold Mines Ltd. resumed construction of a 125 tonne-per-day pilot plant test mill and began construction of a tailings pond. Trenching and drilling were done in the area of the Peter, Cosmopolitan and Big Solly veins on the Loco property. Bralorne also did rehabilitation work on the 800 level in the Bralorne mine. In early 2004 Bralorne plans to mine a 6000 to 8000 tonne bulk sample from the Peter vein, which will be processed in the pilot mill.

Work on the **Elk (Siwash North)** project (Photo 4) of Almaden Minerals Ltd. may lead to another high-grade underground gold producer. Located southeast of Merritt and just off the Coquihalla Connector highway, this deposit produced over 50 000 ounces gold in direct-shipping ore from open pit and underground operations between 1992 and 1995. Grades were consistently high, averaging about 96 g/t Au. The most recent resource calculation, which was done after completion of drilling in 2000, reported indicated and inferred resources as 111 744 tonnes grading 39.5 g/t Au.

Photo 4. Drill at Elk project with Siwash North pit in background.

The company conducted a major drilling campaign in 2003 to further define resources in the Siwash North (B) and WD veins. Over 6500 metres were drilled and both veins yielded numerous narrow, high-grade intersections. These results will be incorporated into a new resource calculation.

Almaden also began evaluating possible mill and tailings storage sites, with the goal of putting the property into commercial production. A 110 tonnes per day, modular, gravity/flotation mill was purchased from a mine in Alaska and transported to a site near the property. The mill includes power generators, a partial assay lab, and furnace room equipment.

The **McKinnon Creek (J & L)** polymetallic deposit, located north of Revelstoke, was acquired by BacTech Mining Corporation late in the year. The J & L Main zone comprises an arsenopyrite-bearing massive sulphide body. A 1996 resource calculation showed 3.6 million tonnes grading 7.24 g/t Au with additional Ag, Zn, and Pb credits. The company has developed bioleaching technology for treatment of refractory ores and plans to conduct prefeasibility studies.

The largest potential development in the region is the **Prosperity** porphyry gold-copper deposit of Taseko Mines Ltd., located southwest of Williams Lake. The most recent information from the company lists estimated measured and indicated resources at 491 million tonnes grading 0.22% Cu and 0.43 g/t Au.

EXPLORATION PROJECTS

Porphyry and Related Targets

Higher copper and gold prices and good success reported from Afton, Mt. Polley, Red-Chris and other advanced porphyry projects in northern BC is perking interest in copper-gold porphyry deposits in the Quesnel terrane.

Abacus Mining and Exploration Corp. continued work on their large **Afton Area** property package, which was optioned from Teck Cominco Ltd. The claims are located in the Iron Mask batholith and include the Rainbow, Crescent and DM-Audra alkalic porphyry Cu-Au occurrences, as well as the recently closed Ajax West and Ajax East pits. Abacus focused their interest on the **Rainbow** property. The company completed a large 3-D IP and magnetic survey, and drilled four deep holes on the Rainbow #2 Cu-Au zone. This deposit has a reported resource of 15 900 000 tonnes grading 0.528% Cu with undefined Au, Ag, Mo and Pd values. A high-grade core is suggested by Teck hole 97-05 which cut 159 m grading 1.078% Cu and 0.322 g/t Au. The 2003 holes hit only narrow intervals of high-grade mineralization at depth; the best was 9.0 m grading 2.10% Cu and 0.55 g/t Au. About 10 000 m of drilling is planned for 2004.

South of the Iron Mask batholith, Green Valley Mine Inc. and Lakewood Mining Company Ltd. drilled the **Wood** property. The eight drill holes tested Induced Polarization and Mobile Metal Ion geochemical anomalies. They intersected Nicola Group volcanics with some intrusive dikes, however no significant metal-bearing mineralization was encountered.

A little further southwest, midway between the Afton and Highland Valley Copper mines, Auterra Ventures Inc. conducted trenching on the **Rabbit North** property. The targets are alkalic porphyry Cu-Au deposits and porphyry-related veins, similar to the Snip mine in northwest BC. The latter is suggested by a 1997 drill hole which intersected 15.4 g/t Au over 8 m.

G W R Resources Inc. drilled 16 holes on the North Zone of the **Ann** claims near Lac La Hache to test alkalic porphyry Cu-Au mineralization associated with a one kilometre long magnetic anomaly. Several of the holes intersected interesting values, such as hole 03-3 with 48 m grading 0.41% Cu and 0.07 g/t Au, and hole 03-10 with 9 m grading 0.57% Cu and 0.36 g/t Au. Just after year-end, Candorado Operating Company Limited announced that it would option the **Spout Lake** and **Mac** claims from G W R. These claims are located to the west and northeast. Two holes were drilled by Nustar Resources Inc. on the **Christmas Lake** porphyry/skarn gold project, located northeast of 100 Mile House.

On the **Big Kidd** property near Merritt, Christopher James Gold Corp. drilled 9 holes and dug three trenches to test alkalic porphyry gold-copper mineralization hosted by the Big Kidd breccia. Broad intervals of low-grade mineralization were encountered, for example, hole 2003-07 intersected 61.59 m grading 327 ppb Au and 1464 ppm Cu.

North of Princeton, Bearclaw Capital Corp. acquired the **Axe** alkalic porphyry Cu-Au prospect. Previous drilling that totaled about 14 000 m in 185 drill holes, defined four mineralized zones with an aggregate indicated resource of 39 100 000 tonnes grading 0.39% Cu (at a 0.25% Cu cut-off), along with an inferred resource of 32 000 000 tonnes of similar grade. The gold content has not been determined. The overall resource includes an inferred oxide resource of 8 500 000 tonnes grading 0.54% Cu.

Near Little Fort, New Cantech Ventures Inc. and Providence Exploration Corp. optioned the **Bill** and **Cross** claims. One hole was drilled on the Bill property to test anomalous gold, copper and molybdenum values contained in soils and altered felsic intrusive float. Nicola Group volcanic and sedimentary rocks underlie most of the area. A little further to the northwest in the Little Fort belt, Electrum Resources Corp. optioned their **Deer Lake** porphyry/skarn property to Azteca Resources Ltd., and their **Friendly Lake** alkalic porphyry property to Lithic Resources Ltd.

Getty Copper Inc. conducted limited surface surveys on the **North Valley** calc-alkalic porphyry copper-molybdenum prospect in the Highland Valley. Late in the year, Getty announced the signing of a memorandum of understanding with Highland Valley Copper (HVC) to explore and develop the property. Previous work by Getty outlined two large, intense IP chargeability anomalies on this property, which is located northwest of the HVC operation. Further IP surveys and drilling are planned for 2004.

The HVC agreement does not include the **Getty North** or **Getty South** porphyry copper deposits or other prospects on Getty's large Highland Valley property holding. Previous work at Getty North defined a drill indicated and inferred resource of 72.1 million tonnes grading 0.31% Cu, including 10.0 million tonnes of oxide grading 0.40% In late 2003 Getty raised $2 million which it plans to use for further exploration and development of these deposits.

Vein Targets

Mesothermal or epithermal gold prospects are an attractive target for small companies because they offer potential for near-term, high-grade production and fast return on investment.

J-Pacific Gold Inc. conducted extensive road building and trenching on the **Elizabeth** property located north of Lillooet. Trenching of a soil anomaly discovered several new narrow but very high-grade mesothermal gold-quartz veins in an area named the **Southwest vein zone** (Photo 5). For example, surface chip sampling returned values ranging up to 194.33 g/t Au and coarse metallic gold was observed in some vein exposures. The new veins are some 400 metres away from previously known veins like the Main and West veins, which were explored by underground work in the 1940s and 1950s, and again in 1990. Interesting Au, Ag, Cu and Mo results were also returned from the No. 9 area to the northwest. As noted above, J-Pacific also owns the nearby **Blackdome** gold-silver mine/mill complex, which is currently on standby but could be used for custom milling if sufficient ore can be defined at Elizabeth.

North American Gem Inc. optioned the **Bonaparte** gold vein property (Photo 6) northwest of Kamloops, which hosts at least eight narrow veins with potential for high-grade gold. Surface mining from the Gray Jay and Crow vein in 1994 produced about 3700 tonnes of high-grade ore which was trucked to the Trail smelter. North American tested several veins with 15 drill holes and trenching; some results were encouraging. The company is considering an underground program for 2004.

Locke B. Goldsmith explored the **Randi** property, located northwest of Boston Bar, by means of a major drilling project in 2003. The target is mesothermal Au veins.

Photo 5. Tom Illidge at the Southwest vein zone gold discovery, Elizabeth property (courtesy J-Pacific Gold Inc.).

Photo 6. Trenching on the Eagle vein, Bonaparte gold property (courtesy North American Gem Inc.).

Ecstall Mining Corp. and Eldorado Gold Corp. drilled several holes beneath and adjacent to the **Dusty Mac** Au-Ag mine, a past producing low-sulphidation epithermal breccia body located near Okanagan Falls. A total of 93 372 tonnes was mined from a small open pit in 1975 and 1976. The average recovered grade was 6.49 g/t Au and 113 g/t Ag. The 2003 holes were designed to test a structural reinterpretation of vein geometries in that area. Unfortunately, several of the holes did not reach bedrock

due to thick overburden and were abandoned. The other holes were unsuccessful in locating the veins and Eldorado has now dropped the option. Ecstall shifted its focus to surface work on several other targets including the Chalcedony zone and Banded vein. The mineralization, structural setting and host lithologies have many similarities to the Kettle River mine in northern Washington State, where recent discoveries have been made.

Ecstall also optioned the nearby **Vault** epithermal Au-Ag property, which Inco Ltd. explored with 181 drill holes between 1982 and 1990. The North vein is a narrow quartz-carbonate-adularia structure with an indicated resource of 152 000 tonnes grading 14 g/t Au. The Main zone is reported to have a resource of 1.55 million tonnes at 2.49 ppm Au. Ecstall is compiling and reinterpreting the large data set.

Almaden Minerals Ltd. conducted grassroots prospecting in the Merritt-Spences Bridge area for low-sulphidation epithermal Au-Ag prospects. This work was a follow-up from successful prospecting in 2001 that resulted in staking of the **PV** claims on Prospect Creek. Float sampling returned up to 43.34 g/t Au with anomalous Ag, As, Sb, Hg and Mo. A small IP survey completed in 2003 identified several linear resistivity features that may represent vein zones.

In 2003 Almaden staked the **NIC** claims to cover quartz veins with grab samples assaying up to 23.6 g/t Au and 180 g/t Ag and chip samples up to 6.15 g/t Au over 0.5 m. The **SAM** claims were staked to cover a 6 m wide vein zone with anomalous Au values.

Further to the northwest and west of the town of Cache Creek, Wyn Developments Inc. optioned the **Blustry Mountain** property which hosts a large alteration zone with a coincident polymetallic soil anomaly. The very large **Rand** property, which surrounds the Blustry Mountain property was also optioned.

North of Kamloops, Molycor Gold Corp. conducted surface rock chip sampling and magnetometer surveys on the past producing **Windpass** gold mine property. Between 1916 and 1944, the mine is reported to have produced 93 435 tonnes of quartz-sulphide vein material with a recovered grade of 11.47 g/t Au and minor Ag and Cu values. Molycor also conducted metallurgical studies on a 50 kilogram composite bulk sample, as part of an investigation into the feasibility of re-processing about 40 000 tonnes of dump material.

In the Gold Bridge mesothermal gold district, Mill Bay Ventures Inc. drill-tested the **California** vein on the BRX property with good results. The company also carried out soil surveys and trenching. Mill Bay plans to drift on the vein to get a better idea of grade. Some 15 km to the north, Linux Gold Corp. explored the **Ty** property, however, results were disappointing. Also in the Gold Bridge district, Menika Mining Ltd. conducted limited surface sampling on the **Reliance** property with encouraging results.

Columbia Yukon Explorations Inc. acquired the **Barnes Creek** grassroots gold target in the Monashee Pass area from a Nelson-based prospecting syndicate. Several creeks in the area carry placer gold and the company focused their search for a bedrock source on the ridge south of Keefer Lake. A large soil survey outlined several strong gold-arsenic anomalies which the company plan to test by excavator trenching.

Also near Monashee Pass, New Cantech Ventures Inc. re-opened a trench on the **Mac** property. Sampling returned 16.8 g/t over 12.5 m.

West of Vernon, Solomon Resources Ltd optioned the **Bouleau** property, known for narrow high-grade gold-quartz veins hosted by intrusive rocks.

The **Blackhorn** property, located southwest of Williams Lake, was optioned by Skeena Resources Ltd. The property hosts a number of both high-grade gold bearing quartz-carbonate veins and base-metal veins in a complex geological environment.

Skarn Targets

A few kilometres east of the historic Nickel Plate gold mine, the **Panorama Ridge** gold skarn property has numerous targets including the Panorama, Epic and Castle areas. In the fall, Goldcliff Resources Corp. drilled 19 holes and by year-end assays were reported for three holes. Hole 23003 cut an encouraging intersection of 77.02 m grading 0.93 g/t Au. This hole was drilled beneath an old Placer Development trench which returned 0.59 g/t Au across 88.93 m including 1.26 g/t Au over 22 m.

Photo 7. Drill at York prospect with Nickel Plate mine in background, Panorama Ridge gold property (courtesy Goldcliff Resources Corp.).

Magmatic Targets

Joint venture partners Bright Star Ventures Ltd. and Cusac Gold Mines Ltd. drill-tested the **DP** copper-platinum group element target on the western margin of the Tulameen ultramafic complex. Previous soil sampling identified anomalous Pt-Pd-Cu-Au values in soils associated with an IP chargeability anomaly. The holes intersected gabbro and hornblende clinopyroxenite targets in the Tulameen ultramafic complex, but no results were announced by year-end. Bright Star did announced that it discovered a new platinum occurrence within the central dunite core of the complex. Grab samples of serpentinized, chromite-bearing dunite returned values ranging from 0.54 g/t to 24.9 g/t Pt.

Nearby to the south, Sargold Resource Corp drilled the **Lodestone Mountain** iron deposit. The deposit is known to contain a large, low-grade magnetite-vanadium-titanium resource. Anomalous platinum values have also been reported.

Late in the year Goldrea Resources Corp and Molycor Gold Corp drilled two holes to test the **Dobbin** Cu-Pt-Pd prospect west of Kelowna. A deep hole in 1997 returned an impressive 111 m intersection grading 0.19% Cu, 0.41 g/t Pt and 0.35 g/t Pd in the Central Anomaly zone. The 2003 drilling tested the Kenny 2000 zone, located 500 m to the west. The holes intersected interesting values hosted by hornblende gabbro. For example, hole D-03-2 cut 6.1 m grading 0.15% Cu, 0.39 g/t Pt and 0.26 g/t Pd. The origin of the unusual mineralization at Dobbin is debatable because it has both hydrothermal ("porphyry") and magmatic features. A good review of the mineralization and its possible genesis was presented by Nixon and Carbno (2001).

Argent Resources conducted limited soil geochemical surveys on the **Iron Lake** Cu-Au-Pt-Pd property located northeast of 100 Mile House. The property is underlain by a mafic/ultramafic intrusive complex that intrudes Nicola volcanic rocks, and there is potential for porphyry or magmatic mineralization.

At the **Fir** property north of Blue River the focus was on metallurgical studies. The property is owned by Commerce Resource Corp. and hosts a significant carbonatite-hosted tantalum-niobium phosphate deposit. Indicated resources are now 5.65 million tonnes grading 203 g/t Ta_2O_5 and 1074 g/t Nb_2O_5 with an additional inferred resource of 6.74 million tonnes at the same grade. Commerce also owns the **Verity** deposit, which lies a few kilometres to the north, and has a resource of 3.06 million tonnes grading 196 g/t Ta_2O_5, 646 g/t Nb_2O_5 and 3.2% P_2O_5.

Coal and Coal Bed Methane Targets

The Tertiary basins of southern BC continue to receive interest for their coal and coalbed methane (CBM) potential. Petrobank Energy and Resources Ltd. conducted seismic surveys over the **Princeton** basin and, depending on results, were considering a five-hole pilot test CBM project for late in the year or 2004. At **Merritt**, Forum Development Corp. planned three short holes to test coal and CBM potential in the Middlesboro collieries area south of town. The Province is researching ownership and considering disposition of CBM rights for the **Hat Creek** basin, which is estimated to contain more than 5 billion tonnes of impure high volatile bituminous coal.

ACKNOWLEDGEMENTS

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SOUTHWEST REGION

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SUMMARY

The Nanaimo office of the Mining Operations Branch of the British Columbia Ministry of Energy and Mines was closed on March 31, 2003. As a result, monitoring of exploration activity in the Southwest Region was reduced in 2003, and this review is much less detailed than in previous years. This report has been prepared by Mike Cathro of the Kamloops office of the Mining Operations Branch, but draws heavily on material presented previously in British Columbia Mineral Exploration Review 2003 (Schroeter *et al.*, 2004). It is hoped that a more complete review will be possible in future years.

Exploration activity in the Southwest Region was steady in 2003 with most investment directed to precious-metal rich vein, stratiform base-metal and industrial mineral targets.

Exploration spending was estimated at $3.0 million, down slightly from 2002 (Figure 1). Drilling activity was up significantly to about 40 000 metres (Figure 2), mainly because of a renewal of underground exploration work at the Myra Falls mine. There were nine major exploration projects (Figure 3).

The region hosts one large underground base-metal mine, one small underground coal mine and numerous industrial mineral quarries. These operations and the region's major exploration projects are shown on Figure 4. Major exploration projects are also listed in Table 1.

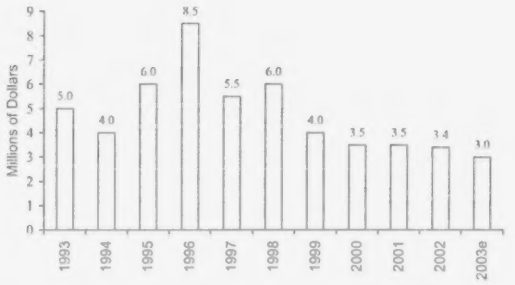

Figure 1. Annual exploration spending, in millions of dollars, Southwest Region.

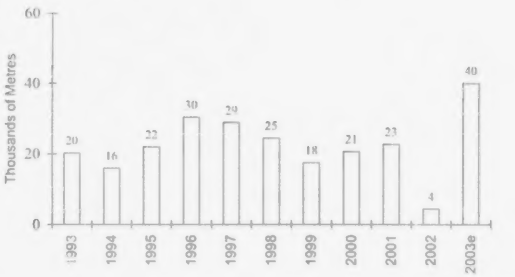

Figure 2. Annual exploration and development drilling, in thousands of metres, Southwest Region.

MINES AND QUARRIES

Metals

The **Myra Falls** mine, owned and operated by Boliden-Westmin (Canada) Ltd., has been in operation since 1966. In excess of 23 million tonnes of massive sulphide, copper-zinc-gold-silver ore has been mined from several orebodies along a 6-kilometre northwest trend. Current ore reserves are situated in two main areas, Battle-Gap and HW-43 block.

In 2003, Boliden re-established its exploration program at the mine, including the development of a 5-year exploration plan. A total of 35 targets have been identified and prioritized. Underground drilling will test for additional ore in a number of zones, including HW North lens, north of Gap, south of Gopher, east of Battle

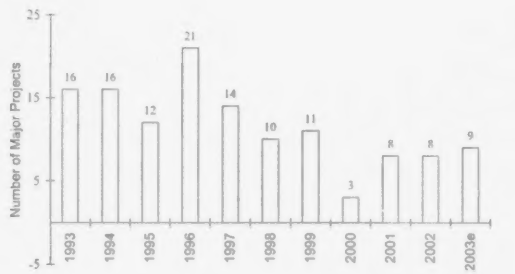

Figure 3. Number of major exploration projects per year, Southwest Region. Major projects are defined as those with trenching or drilling and expenditures exceeding $100 000.

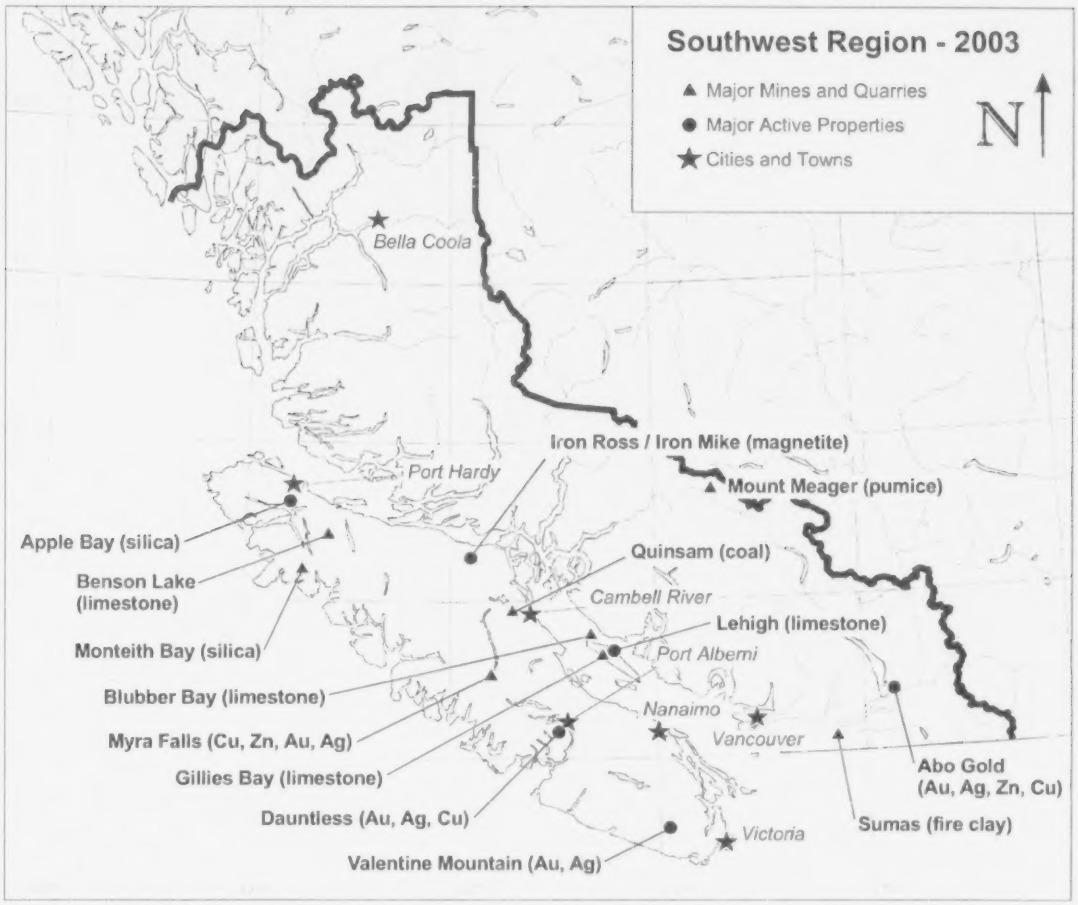

Figure 4. Mines, quarries and major exploration projects, Southwest Region, 2002.

and north of Extension. A larger drilling program is planned and an exploration drift towards the Marshall zone at the western end of the property has been proposed for 2004. Boliden submitted a revised report requesting permission to connect to the BC Hydro power grid.

Coal

Hillsborough Resources Ltd. continues to operate its **Quinsam** underground thermal coal mine at about 330 000 clean tonnes per year, with a work force of about 40 people. In 2003, the company planned a 900-metre exploration drilling program in the South 4 area, as well as some in-fill drilling for reserves. In September the company signed a two-year contract with a large international cement manufacturer, to supply between 118 000 and 150 000 tonnes of coal per year to two cement plants in Vancouver and Seattle. Quinsam is being considered as a supplier for a possible 60-megawatt power plant, which would use 0.5 to 1 million tonnes per year. A letter of intent was signed with Cinergy Corp. of Cincinnati, Ohio to submit an independent power generation proposal to BC Hydro.

Industrial Minerals

Limestone and Dolomite

The largest limestone production centre in the province is **Texada Island**, where two quarries, **Gillies Bay** (Texada Quarrying Ltd.) and **Blubber Bay** (Ash Grove Cement Corporation), traditionally ship 5 to 6 million tonnes annually. Their customers are in British Columbia, Washington, Oregon and California and they use the limestone for cement, chemical and more recently, agricultural use. In 2003, 3.25 million tonnes of limestone and 750 000 tonnes of aggregate are expected to be shipped from Gillies Bay where limestone production capacity is over 5 million tonnes and aggregate (crushed rock) capacity is approximately 1.5 million tonnes.

TABLE 1. MAJOR EXPLORATION PROJECTS, SOUTHWEST REGION, 2003

Property	Operator	MINFILE	NTS	Commodity	Deposit Type	Work Done
Abo Gold (Harrison Gold)	Northern Continental Resources Ltd. / Eagle Plains Resources Ltd.	092HSW092	92H/05E, W	Au, Ag, Zn, Cu	Mesothermal vein	4 ddh, 682 m; trenching; 15 km road rehab.
Apple Bay (Pem 100)	Electra Gold Ltd.	092L 150, 269, 308	92L/12E	Chalky geyserite	Industrial mineral	30,000 tonne bulk sample; approx 20 ddh, 1200 m; environmental studies
Blubber Bay	Ash Grove Cement Company	92F 479	92F/10E	Dolomite	Industrial mineral	~ 29 holes, 1200 m
Dauntless	SYMC Resources Ltd.	092F 168	92F/02W	Cu, Ag	Mesothermal vein	road; prosp; geol; trenching
Iron Ross / Iron Mike	Hillsborough Resources Ltd.	92K 043	92K/05W	Magnetite	Industrial mineral	percussion drilling; bulk sample; road upgrading
Lehigh Central Texada	Lehigh Northwest Cement / Chemical Lime Company of Canada Ltd.		92F/10E	Limestone	Industrial mineral	~ 1200 m drilling; 4 km trenching
Myra Falls	Boliden-Westmin (Canada) Ltd.	092F 330, 071, 072, 073	92F/12E	Cu, Zn, Pb, Au, Ag	VMS	u/g exploration drilling; approx. 33,500 m
Quinsam	Hillsborough Resources Limited	092F 319	92F/14W	Coal	Sedimentary	planned 6 ddh, 900 metres
Valentine Mountain	Beau Pre Explorations Ltd.	092B 108		Au, Ag	Mesothermal vein	3 ddh, 950 m completed and one 300 m hole planned for Dec; environmental studies

Depending on customer demand, aggregate may be newly quarried granitic rock, stockpiled granite, limestone or a combination of these products.

Ash Grove Cement upgraded its crushing plant in 2002. In 2003, four million tonnes of rock are expected to be mined and over two million tonnes of limestone shipped from Blubber Bay. Aggregate production was about 400 000 tonnes. Depending on its ability to win future contracts in California, the company is considering building a $10-million ship-loading facility on Texada Island. A joint venture of Lehigh Northwest Cement Limited and Chemical Lime Company of Canada Limited conducted exploration drilling and trenching on the **Lehigh Central Texada** project.

White, high-calcium carbonate is also produced from the Texada Quarrying Ltd. Gillies Bay quarry and from the IMASCO Minerals Ltd. **Benson Lake** quarry on Vancouver Island. It has a variety of uses including paper, paint and plastic filler.

A major exploration program is underway by Ash Grove Cement to delineate a dolomite deposit adjacent to its Blubber Bay limestone quarry on Texada Island. If needed, this deposit may be in production early next year.

Crushed Stone and Aggregate

Grassroots exploration for traditional construction materials continues to expand along the British Columbia coastline. Shipments of crushed stone from Texada Island and other coastal sources are making significant inroads into the Vancouver, Seattle, San Diego, San Francisco and Los Angeles markets. Texada Island limestone producers have already started to exploit this opportunity (see above). Texada Island producers are well established, and crushed rock is the natural byproduct of their limestone operations. Natural aggregate is the focus of similar market demands. Lehigh Northwest Cement Limited shipped approximately one million tonnes of aggregate from its facility at **Sechelt** to the San Francisco Bay area in 2003.

Polaris Minerals Corporation, in partnership with Eagle Rock Materials Ltd., is participating in the development of the **Eagle Rock** aggregate operation near Port Alberni. Qualark Resources Inc. and the Yale First Nation have proposed a 12 million tonne-per-year aggregate operation, together with placer gold washing, at the **Hillsbar** quarry near Yale. Polaris Minerals Corp. and the Kwakateil First Nation have a proposal for quarrying from its **Orca** sand and gravel operation near Port McNeil. Other companies propose similar ventures, including Southern Pacific Development Corp.'s project near **Port Renfrew** on southwestern Vancouver Island.

Silica-Alumina Rock

During 2003, Lehigh Northwest Cement Limited (formerly Tilbury Cement Ltd.) mined 49 000 tonnes of geyserite (silica material and minor clay) from its quarry at **Monteith Bay** on western Vancouver Island to supply its cement plant in Delta. Electra Gold Ltd. and Homegold Resources Ltd. mined about 30 000 tonnes of geyserite from its **Apple Bay** deposit on Vancouver Island; this material will be tested at the Ash Grove Cement plant in Washington State.

Industrial Clay and Shale/Sandstone

Clayburn Industries Ltd. of Abbotsford processes fireclay from **Sumas Mountain** into a variety of refractory bricks and castable products, which are exported worldwide. Sumas Clay Products Ltd. also produces small quantities of flueline pipe and ornamental and facing bricks near Abbotsford. Clayburn, Lafarge Canada Inc. and Lehigh Northwest Cement can produce about 500 000 tonnes of shale and sandstone from their Sumas shale quarry. Clayburn is developing new lightweight aggregate with good insulation properties, based on this material.

Ironwood Clay Company Inc. is the largest producer of cosmetic/medical clay in British Columbia. It mines seasonally from the **De Cosmos Lagoon** on Hunter Island, west of Bella Coola. Similar material is also mined from **Carrie Cove** in the Comox Valley. It is currently sold by Carrie Cove Cosmetics for medicinal and cosmetic applications. It is also expected that Glacial Marine Clay Inc. will be producing clay for specialized hydroponics applications. Mr. Robert Davie has an undeveloped clay deposit on King Island. The market for cosmetic/medical clay is limited; however, the processed product may retail for about $100/kilogram. The market for specialized hydroponics clays is larger and less stringent; however, the material still retails at prices around $20/kilogram.

Dimension Stone

Westcoast Granite Manufacturing Inc. in Delta, Margranite Industries Ltd. in Surrey and Matrix Marble Corporation in Duncan operate stone-processing plants. Margranite processes imported granite, and nine granite varieties, from at least three quarries in the **East Anderson River**, **Beaverdell** and **Skagit Valley** areas. Another processor, Garibaldi Granite Group Inc. of Squamish, declared bankruptcy during the year.

Huckleberry Stone Supply Ltd. of Burnaby and Mountain High Properties Ltd. of Pemberton produced basalt from small quarries near **Whistler**. In 2003, Matrix Marble concentrated on processing imported and domestic materials at its plant near Duncan, but also extracted blue and white marble from its **Tahsis** quarry in Tlupana Bay. Hardy Island Granite Quarries Ltd. extracted about 3500 tonnes of stone this year and sold it through Bedrock Granite Sales Ltd. in Coquitlam. In 2003, Quadra Stone Ltd. produced a small tonnage of Cascade Coral blocks from its new **Fox Island** quarry.

Pumice, Tephra and Lava Rock

Great Pacific Pumice Ltd. ships a variety of pumice-based products from its **Pum** property on Mount Meager, north of Pemberton. Production in 2003 was estimated at 7000 cubic metres and the material from this deposit was successfully tested by two major cement-producing companies as a pozzolanic additive. Garibaldi Aggregates Ltd. also started to produce pumice from the **Mount Meager** area.

EXPLORATION PROJECTS

Veins

Northern Continental Resources Ltd., under an option agreement with Eagle Plains Resources Ltd., completed a four-hole diamond-drilling program on the **Abo Gold (Harrison Lake Gold)** project, 100 kilometres east of Vancouver. Gold mineralization, commonly associated with pyrrhotite, occurs within quartz veins in nine zones on the property. The veins are hosted by quartz dioritic stocks and, to a lesser extent, metasedimentary rocks. Drilling further tested the margin of the Hill stock, together with the newly discovered North Hill stock zone. Mineralization associated with the Jenner and Portal stocks is reported to have a combined indicated resource of 1.8 million tonnes grading 2.8 g/t Au and an inferred resource of 614 000 tonnes grading 2.79 g/t Au.

Near Port Alberni, SMYC Resources Limited owns several high-grade vein prospects including the **Dauntless** copper-gold-silver deposit and the **Mactush South** property which hosts the Fred and David gold-silver vein deposits. In 2003 the company constructed an access road to Dauntless in preparation for pilot mill tests. Mapping, sampling and drilling are also planned.

At **Valentine Mountain** near Sooke, Beau Pre Explorations Ltd. planned trenching and drilling on narrow high-grade gold vein targets, and completed metallurgical and environmental studies.

On Phillips Arm, Castillian Resources Corp. acquired the **Fanny Bay** property that includes the past-producing **Doratha Morton** and **Alexandria** gold-silver mines.

Magmatic Deposits

In May, 2003 Leader Mining International Corp. released the results of a feasibility study from Hatch Associates Ltd. on its **Cogburn** magnesium metal project, northeast of Harrison Hot Springs. The Cogburn deposit is estimated to have a preliminary measured resource of 25.5 million tonnes grading 24.5% Mg by weight in its proposed Emory zone quarry (300 by 300 m). The feasibility study indicated that the deposit has the potential to become a mine because of its large size, high magnesium grade, low impurity levels, favourable metallurgy and proximity to infrastructure. The capital cost of the project was estimated to be US$1.24 billion. Late in 2003, Leader Mining announced it had received an expression of interest from a major mining company.

On the eastern side of Harrison Lake, Stellar Pacific Ventures Ltd. and International Millenium Mining Corp. continued geological and geochemical surveys on several areas in the search for magmatic Ni+/-Cu+/-PGE deposits. A favourable north-northwesterly trending belt of sulphide-bearing ultramafic rocks, 2 to 10 kilometres wide (**'Pacific Nickel Complex'**) in contact with metasedimentary rocks, was the focus in 2003. This belt extends northwesterly for more than 75 kilometres from the former Giant Mascot nickel producer. The companies completed an airborne geophysical survey over the southern portion of the belt. Also during 2003, International Peruminas Resources Ltd. staked a large block of claims in the northern part of the favourable belt and optioned prospective ground from Murray McLaren and Paul Metcalfe. Follow-up prospecting and mapping resulted in the discovery of several new Ni+/-Cu+/-PGE showings, most notably those on the **Klatt** claim group. These have strong similarities to the mineralization at the Giant Mascot mine, 50 kilometres to the south.

Industrial Minerals

Quinsam Coal optioned the **Iron Ross** and **Iron Mike** magnetite occurrences, approximately 6 km south of Sayward, and several nearby magnetite deposits. Benson Magnetics Ltd. continues to investigate the feasibility of installing a 25 000 tonne-per-year plant near **Benson Lake**, on Northern Vancouver Island.

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